

10 FUN THINGS TO DO WITH YOUR MICROWAVE



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Introduction

Find uses for your microwave you never knew existed with this fun collection from Instructables.com . Don't sell your microwave short! Whether you are conducting science experiments or making gifts, you will unleash your microwave's true potential with these creative and unconventional projects.

Instructables is the most popular project-sharing community on the Internet. We provide easy publishing tools to enable passionate, creative people like you to share their most innovative projects, recipes, skills, and ideas. Instructables has over 40,000 projects covering all subjects, including crafts, art, electronics, kids, home improvement, pets, outdoors, reuse, bikes, cars, robotics, food, decorating, woodworking, costuming, games, and more. Check it out today!

Sarah James
Editor, Food & Living
Instructables.com

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Microwave Science Experiments - Will it blow up? What can we stick in? Microwave Night at MITERS

Published by [stasterisk](#) on February 12, 2008

Author Bio: [stasterisk](#) ([author's website](#))



Hi! I'm Star Simpson! I'm a real me! See more at [<http://stars.mit.edu> stars.mit.edu]. photo by [<http://bea.st/> Jeff Lieberman] (<http://bea.st>) stasterisk - my name is Star, and when I was 13 I signed my name as "St*r", with the * a five pointed star with the "A" a bit bolder. I think I once shortened it to "ST*" and my best friend glanced over and said "ST*?" "How am I even supposed to pronounce that, 'st-asterisk'?" hence stasterisk!

Intro: Microwave Science Experiments - Will it blow up? What can we stick in? Microwave Night at MITERS

[MITERS](#) is a creative heaven for MIT inventor types and practical physicists. We have build parties every Friday at 7 in N52-115, and anyone is welcome to come check it out and build something.

This build party, we got an old junky microwave from a thrift store, and put any

interesting thing into it, before stripping it of its transformers and turning it into a [welder](#) .

Our microwave doesn't have a turntable, but it does have an impeller, which is a piece of metal outside the oven chamber that spins and changes the magnetic resonance of the box to keep standing waves from forming.

Picturing that, or at least keeping it in mind, will give you a clearer idea of why the grapes arc inconsistently, why the lightbulbs don't stay on, etc.

Photos and videos, courtesy of Jordi Castell, posted here so you can hold your own Microwave-It night!

You can also see the original photo/images at http://evalu29.uv.es/~jordi/build_party/



Step 1: Grapes

So, when you cut a grape in half (almost, but not quite fully sliced), they're about the same length as a half-wave of 2.4GHz radiation (which are microwaves).

That means that when you put them in a microwave, they resonate and the energy builds up until the juice boils and creates an ionized gas, and then arcs across the two halves.

We tried it with blueberries too, as they're almost the same size. It did work, but not quite as well.

They don't taste very good afterwards.

Here's what plasma physics on grapes looks like:





Step 2: Light Bulbs

If you put metal in a microwave, the metal will arc and spark. We just want to see if we can make these lightbulbs turn on, so we hide the metal in water, in a crystal chalice, which solves the arcing and sparking problem. (plastic would work just as well).

The lightbulbs have a cool repeating pattern, thanks to the impeller. If you took the impeller out, or had a turntable microwave and removed the turntable, you would get constant light from the bulbs, and could use them as an energy/node detector to find the strong and weak points of the field. From here you can clearly see why your food only thaws/cooks in some spots, and not others.

I like the lighthouse-like effect a lot.





Step 3: Neon Bulbs

We threw in little neon bulbs, too.

The glass of water is sort of like a resistor, preventing the bulb from blowing out by absorbing some power.

Or at least, that was the theory.



Step 4: Ivory Soap

What's so special about Ivory Soap?

What the heck does a bar of soap do when you put in in a microwave?

It's inexplicable, until you watch Alien, and then everything comes clear.





Step 5: CDs

Ah, an old standard.

Here's a cool view:



Related Instructables



[How to Demonstrate Plasma Using Grapes](#) by [kentchemistry.com](#)



[Amazing plasma globe tricks that you never knew before!!!](#) by [Plasmana](#)



[Work safely with high voltage](#) by [kovo](#)



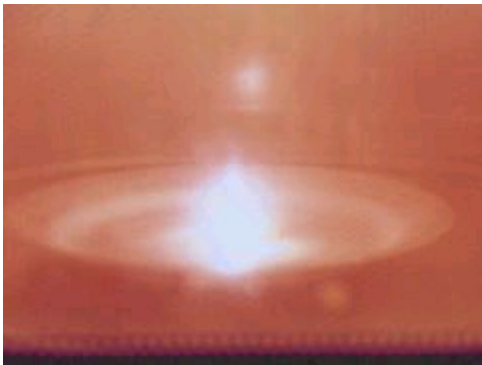
[How To Build A Vacuum Tube Tesla Coil \(VTTC\)](#) by [Xellers](#)



[Microwave a Grape to make a light show](#) by [Spedy](#)



[A simple mechanical resonance demonstrator](#) by [5Volt](#)



[Electric sparks with grapes](#) by [gizmomaster](#)



[How To Take Things Apart Without Killing Yourself](#) by [mad magoo](#)



Edible Chemistry from the Microwave!

Published by [imshanedulong](#) on September 25, 2008

Intro: Edible Chemistry from the Microwave!

With this instructable you can do some semi-complex chemistry in your very own kitchen with this simple recipe **MICROWAVE Peanut Brittle** . It's delicious, simple, and educational! If you don't like learning, ignore the science part, because this is fun and **DELICIOUS** !

Warning: WILL CONTAIN NUTS! (duh!)



Image Notes

1. It may look like puke now but when it dries and is broke apart it is DELICIOUS!



Image Notes

1. The microwave!

Step 1: Ingredients

You Will Need:

- 1 cup sugar
- 1/2 cup corn syrup (preferably light)
- 1 cup raw peanuts
- 1/8 teaspoon salt
- 1 tablespoon butter
- 1 teaspoon vanilla
- 1 teaspoon baking soda

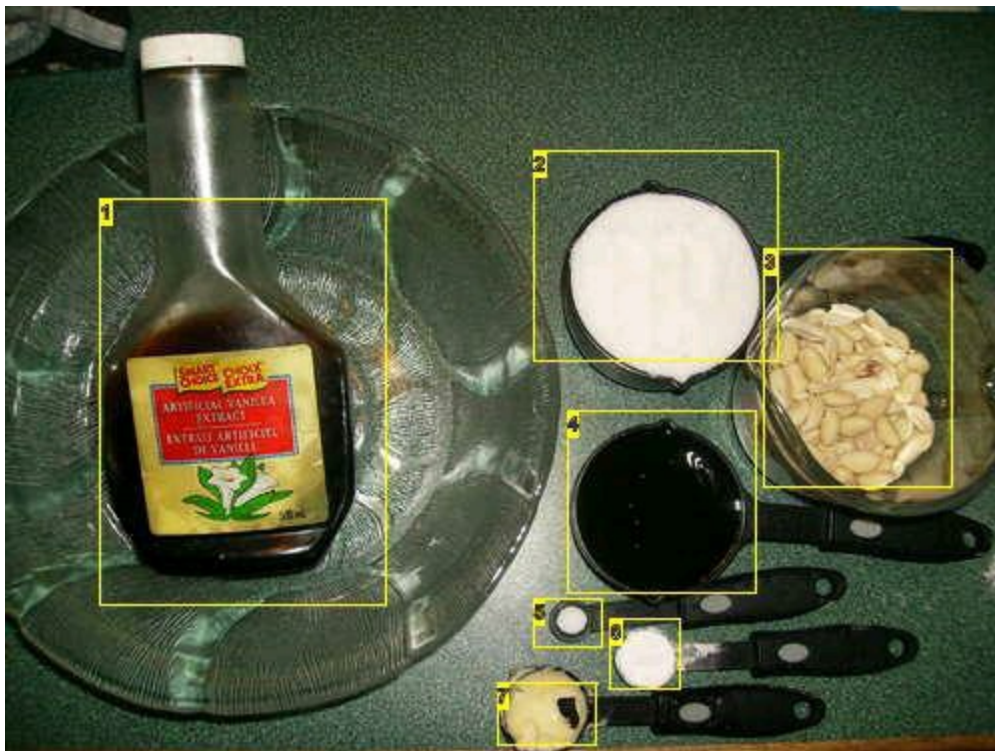


Image Notes

1. Vanilla extract
2. 1 cup sugar
3. 1 cup raw peanuts
4. 1/2 cup corn syrup
5. 1/8 teaspoon salt
6. 1 teaspoon baking soda
7. 1 table spoon butter



Image Notes

1. The microwave!

Step 2: Step 2

Combine the sugar, corn syrup, peanuts, and salt in a 2 quart microwavable bowl. Sorry, no picture of adding salt.



Image Notes

1. Here's the suger!

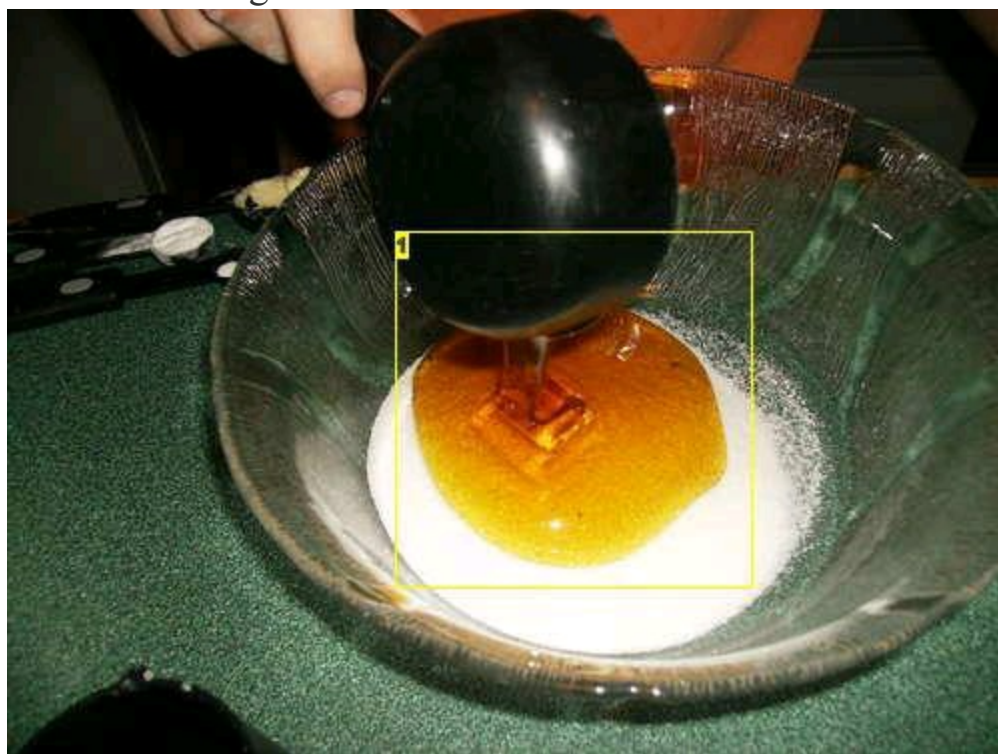


Image Notes

1. and the corn syrup,



Image Notes

1. and the PEANUTS!

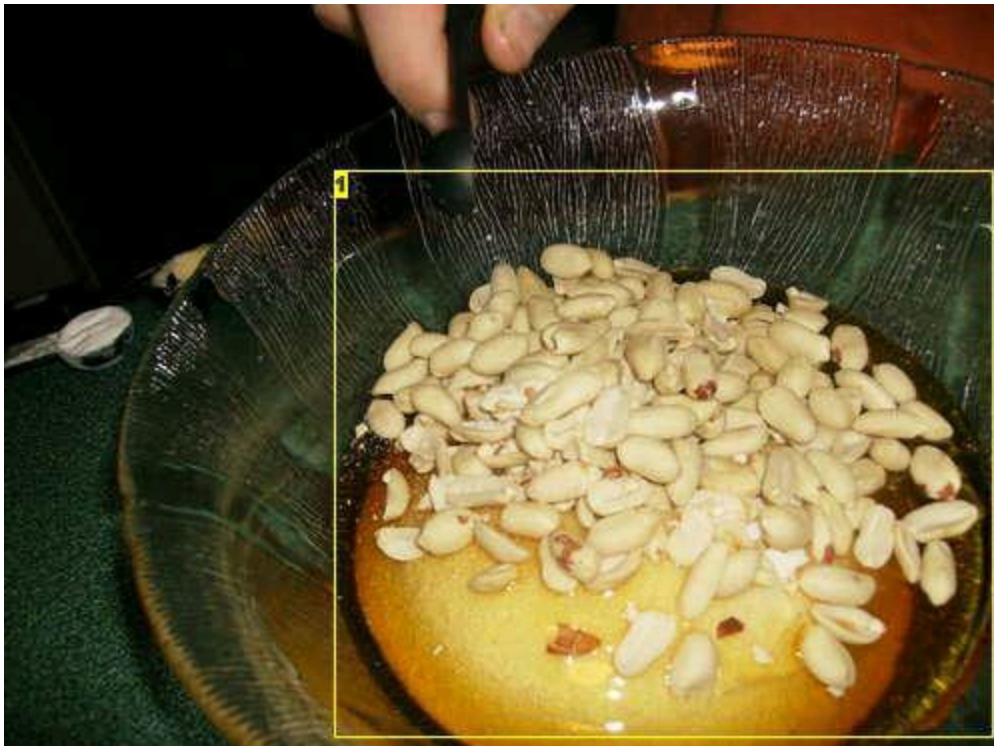


Image Notes

1. Done this step!

Step 3: Step 3

Microwave this on high for 8 minutes. Take it out half way through (4 minutes) to stir and put it back, stirring afterwards. Add butter.



Image Notes

1. After stirring

Step 4: Step 4

Microwave again for 2 minutes (on High) and add the baking soda and vanilla. Stir until light and foamy.



Image Notes

1. Baking Soda



Image Notes

1. More stirring!

Step 5: Step 5

Spread you mixture on a BUTTERED Cookie sheet as thinly as you can. Be sure to soak your bowl in warm (and preferably soapy) water to make it easier to clean.

The Science: The baking soda reacts with the other ingredients to harden it.



Image Notes

1. It may look like puke now but when it dries and is broke apart it is DELICIOUS!

Related Instructables



[Homemade Salted Nut Rolls](#) by [jasonuher](#)



[Homemade Snickers Candy Bar Recipe](#) by [canida](#)



[Mint Milk](#) by [stasterisk](#)



[Chocolate Peanut Butter Cups](#) by [Handmade Kitchens](#)



[**Southern Boiled Peanuts**](#) by [ThreeWestCreative](#)



[**Microwave Potato**](#) by [crazytrain320](#)



[**How to Make Awesome Peanut Butter Chocolate Chip Cookies**](#) by [fungus amungus](#)



[**How to make A Peeps-nut Bunny sandwich**](#) by [MICROLAND](#)



Build a Microwave Transformer Homemade Stick/Arc Welder

Published by [stasterisk](#) on December 23, 2007

Author Bio: [stasterisk](#) ([author's website](#))



Hi! I'm Star Simpson! I'm a real me! See more at [<http://stars.mit.edu> stars.mit.edu]. photo by [<http://bea.st/> Jeff Lieberman] (<http://bea.st>) stasterisk - my name is Star, and when I was 13 I signed my name as "St*r", with the * a five pointed star with the "A" a bit bolder. I think I once shortened it to "ST*" and my best friend glanced over and said "ST*?" "How am I even supposed to pronounce that, 'st-asterisk'?" hence stasterisk!

Intro: Build a Microwave Transformer Homemade Stick/Arc Welder

I had no idea making a DIY welder would be so easy to do. And, it's pretty much

FREE !

Additionally, the stick welder you get is definitely better than any cheap commercial welder you can buy.

Why is this homemade thing **better than something you can buy** ? Because when you factor in shipping and labor and the little bit of retail markup - the companies that make typical cheap buzz boxes will skimp on copper as much as possible. Whereas you can use enough copper in this to make something really juicy, and still spend less, to nothing, compared to a store-bought arc welder.

So here's what you need to build a welder:

- Two beat up old microwaves
- Some 10 gauge wire
- Wire nuts

People throw out microwaves all the time, if you keep your eyes on the curbs.

Or, you can get microwaves at the local thrift store for \$10 each.

Try the warehouse that processes donations - they have to pay to get rid of tons of broken ones.

Stuff you need for welding:

- [Welding helmet](#) (\$16 and up)
- [Welding rods](#) (\$6)
- Vice grip or [purpose-built electrode holder](#) (\$6 for either)
- C clamp for grounding clamp
- [Gloves](#)
- Thick nonflammable (leather) clothing that will cover your arms

Disclaimer: High Voltage ELECTRICITY and lots of CURRENT! Heat, electrocution, and DANGER! You could die and you could go blind.

That said, try this at home!

See this for a lot of [welding safety tips](#)

Here are the really good how-tos that this project is informed by:

[build a 70 amp welder](#)

[the tiny tim welder by tim williams](#)

[home made welding machine](#) (via afrigadget)

Dan Hartman's [how-to](#) is good for reference, too.

And here's the quickest way to [make a DC welder](#) with a bunch of 12 volt batteries.

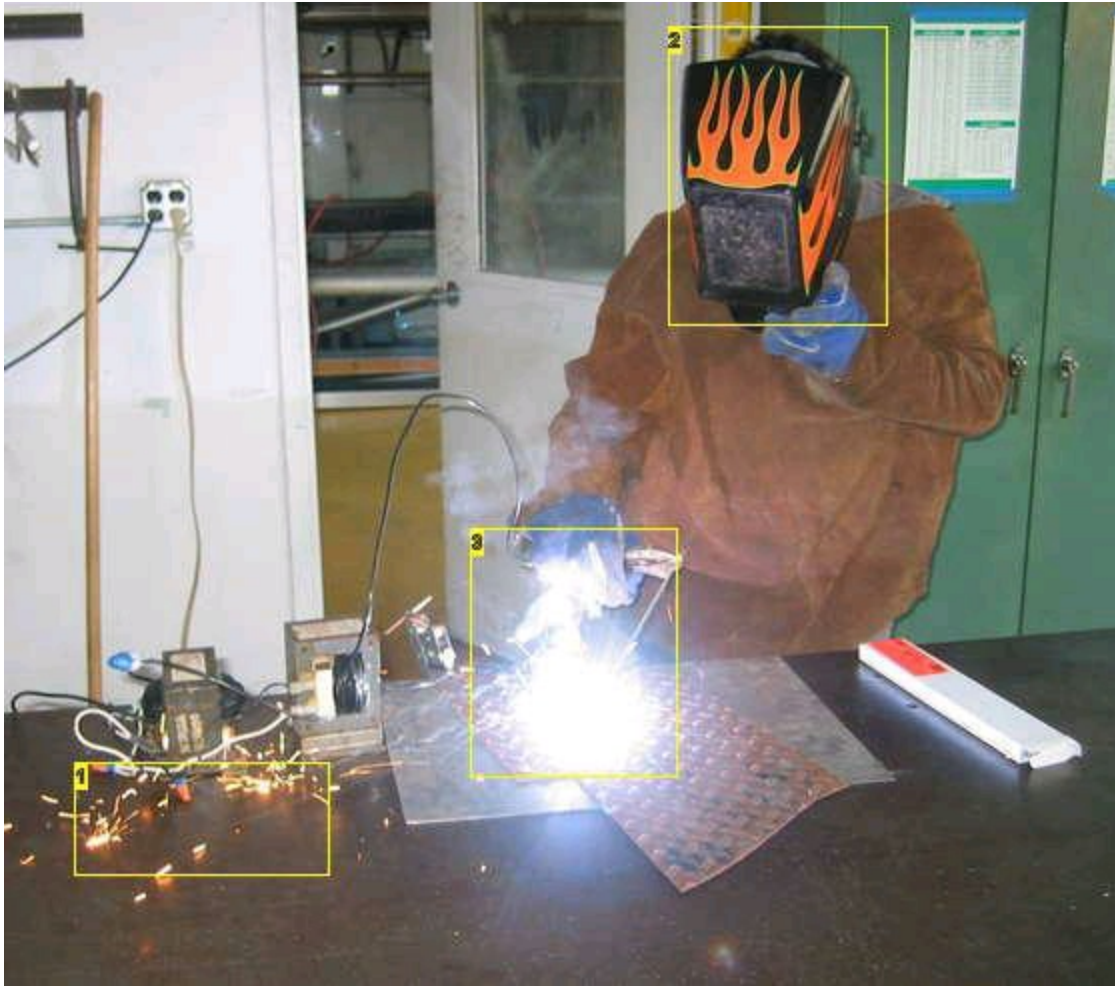


Image Notes

1. sparks! The good kind, from the weld, not the bad kind from the welder.
2. me welding
3. call me Flashdance.

Step 1: Dissect the Microwaves

Invite your non-hardware oriented pals over to help help dissect your donor appliances.

They'll love it. David Grosf donated one of these microwaves under the condition that we take it apart together.

Good safety tip:

You'll find a gigantic capacitor inside the microwave. It looks like a metal can with two tabs on top.

Short it out to make sure it doesn't have any leftover charge on it, before you poke your hands anywhere near. Just put a screwdriver or something metal you aren't connected to, across the two metal terminals shown here.





Image Notes

1. microwaves are full of surprises - smelly sneaker surprise!



Image Notes

1. microwave guts!
2. transformer: save this and use it!

3. front panel electronics: recycle!
4. MAGNETRON: coolest name ever!
5. AC power cable: save this and use it later!
6. fan: recycle!



Image Notes

1. Big Cinder: earth after global warming?
2. very long screwdriver
3. five-bit switcheroo screwdriver
4. Star Simpson's dismantling-microwaves face

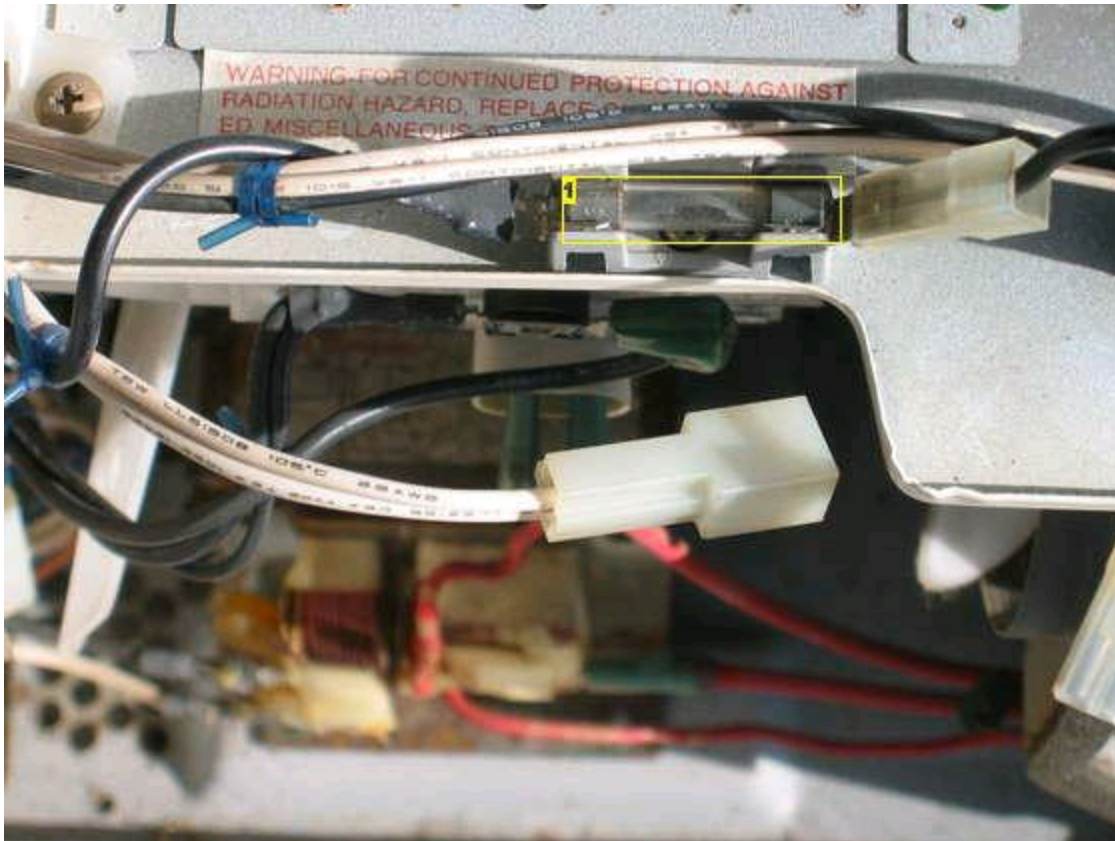


Image Notes

1. magnificent fuse

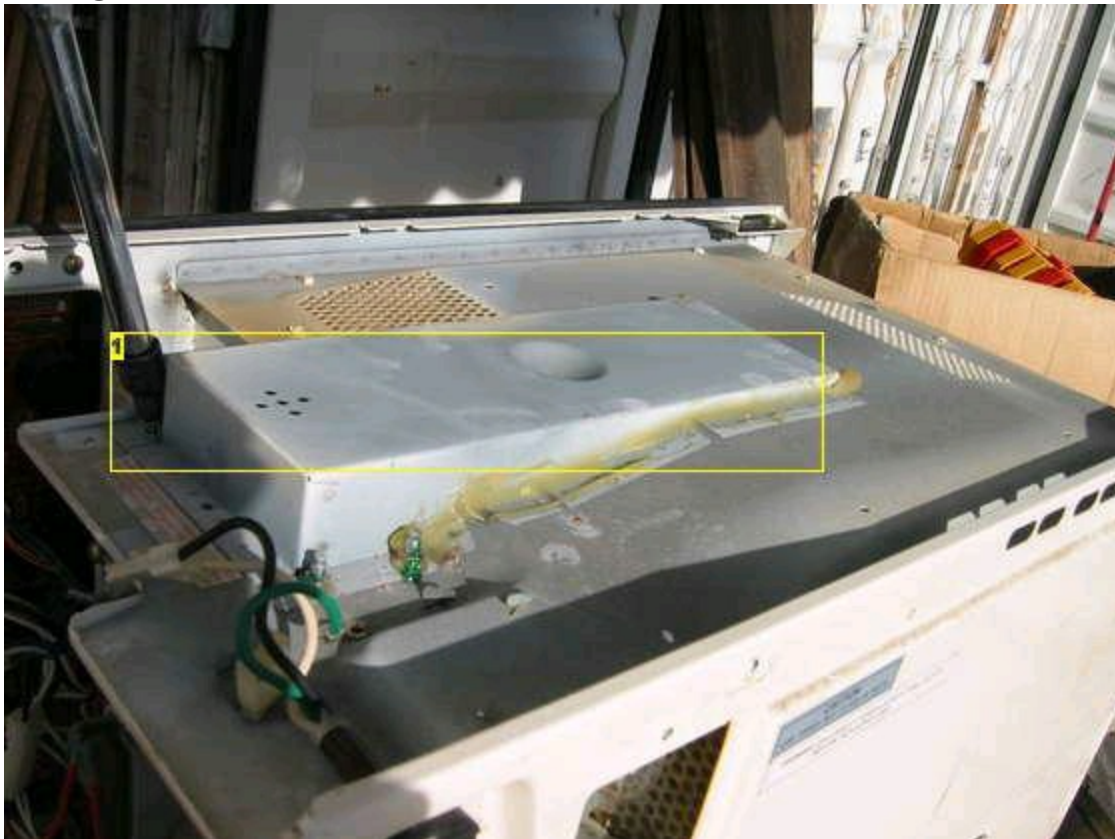


Image Notes

1. waveguide: the magnetron drools its 2.4GHz microwave rays into the oven area, through this.

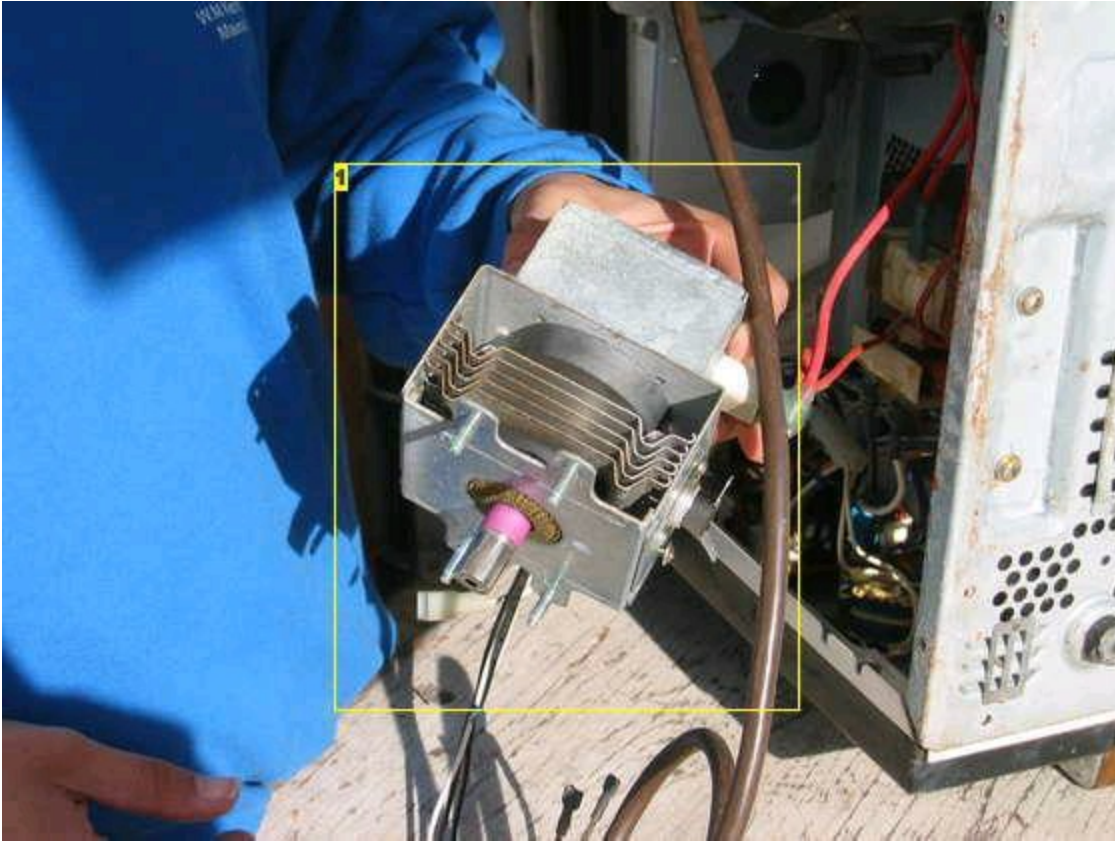


Image Notes

1. this is the magnetron. it's good for tronulizing magnetoids. by which I mean, it produces 2.4GHz radiation.



Step 2: Prepare the Transformers

Chop and knock out the secondary (thin wire) windings. Don't nick or damage the primary windings in any way.

If you do, you could create shorts where two windings conduct to each other, allowing electricity to bypass certain parts of the coil, making effectively a smaller coil, and creating something different than what you expect at the output. Or, you might chop the connection entirely, ruining the primary. So do your best to keep it intact.

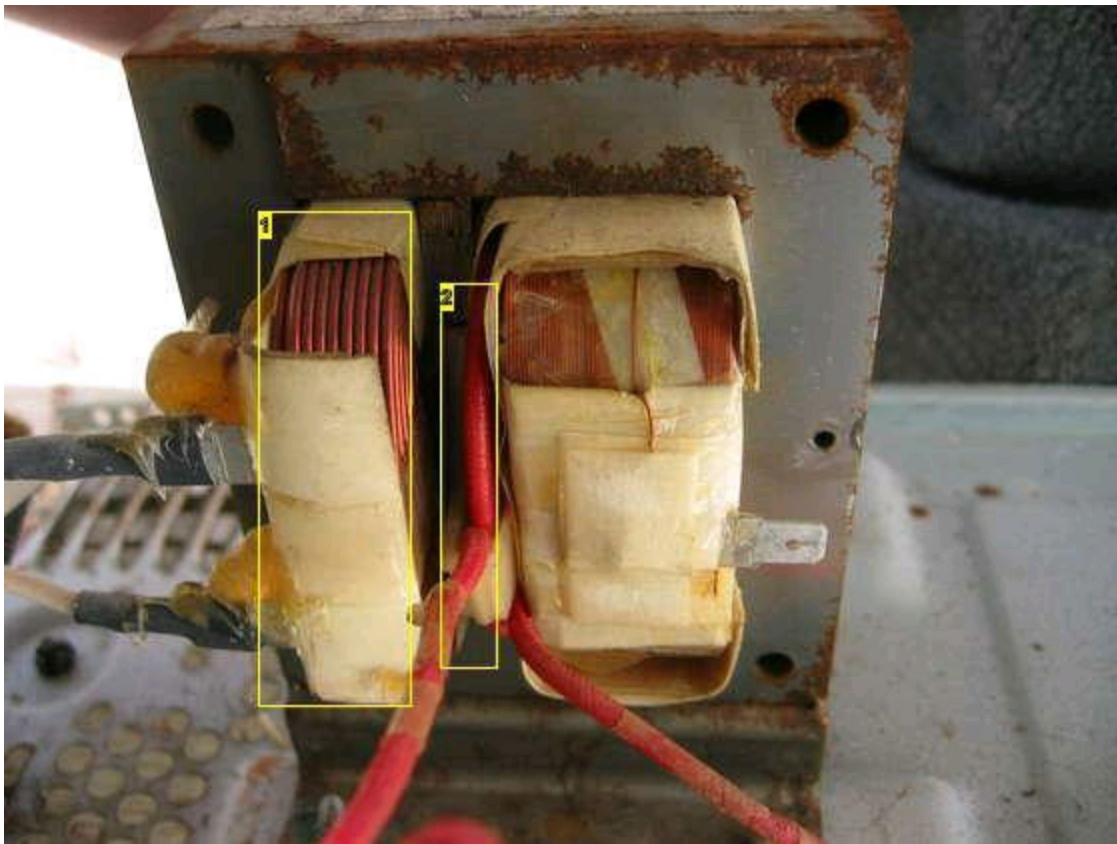


Image Notes

1. Primary windings - powered by the gods of walljuice. Don't harm these in any way.
2. Low-voltage winding for filament current or somesuch thing to feed the magnetron. Remove this.

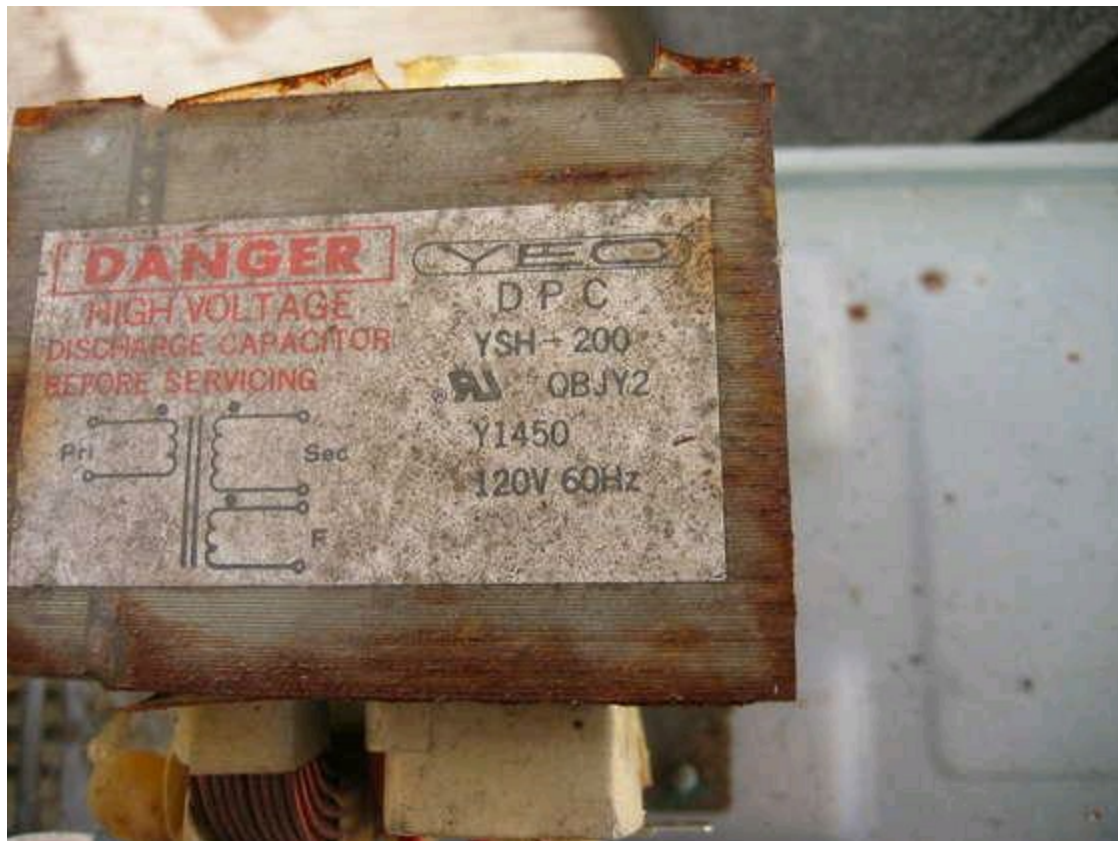


Image Notes

1. use a sharp chisel to cut the copper winding





Image Notes

1. after chiseling, pound the wiring out. be really careful to keep the primary intact, with no nicks.





Image Notes

1. the disemboweled remains of the transformer secondary coils. This is at least a few pounds of pure copper. Sell it to the scrap yard for \$4.50 a pound and take a nice trip.

Step 3: Get some 24 foot chunks of ten-guage wire

We scavenged some heavy wire from an old powerboat the owner was scuttling.
We stripped the outer jacket off and separated the inner conductors to wind new secondaries
on our transformers.



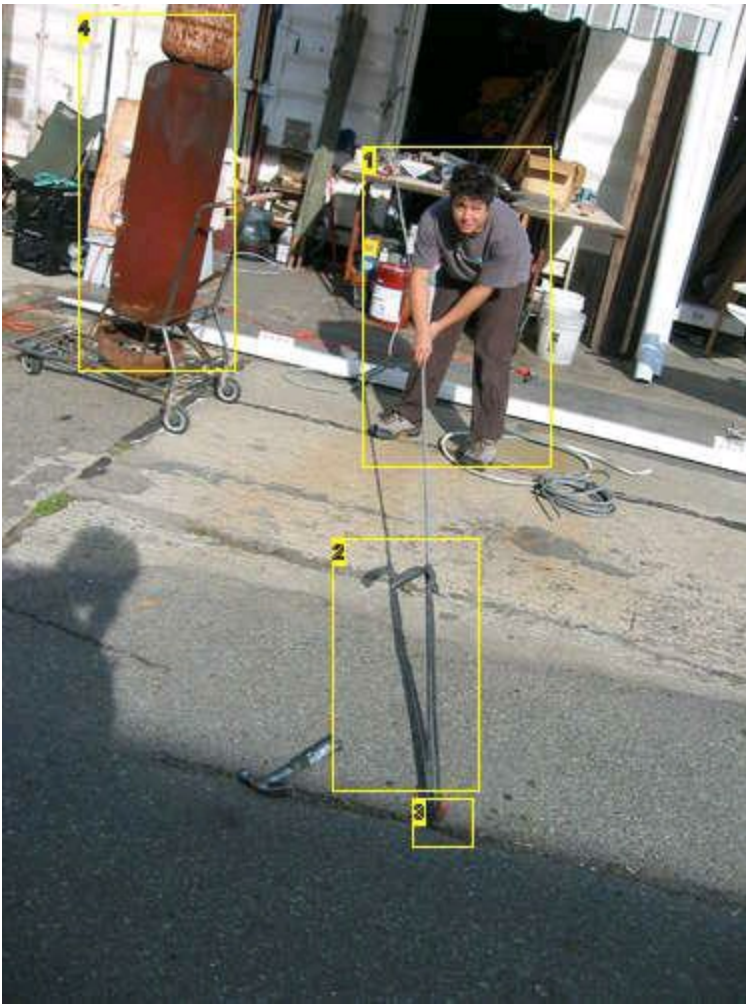
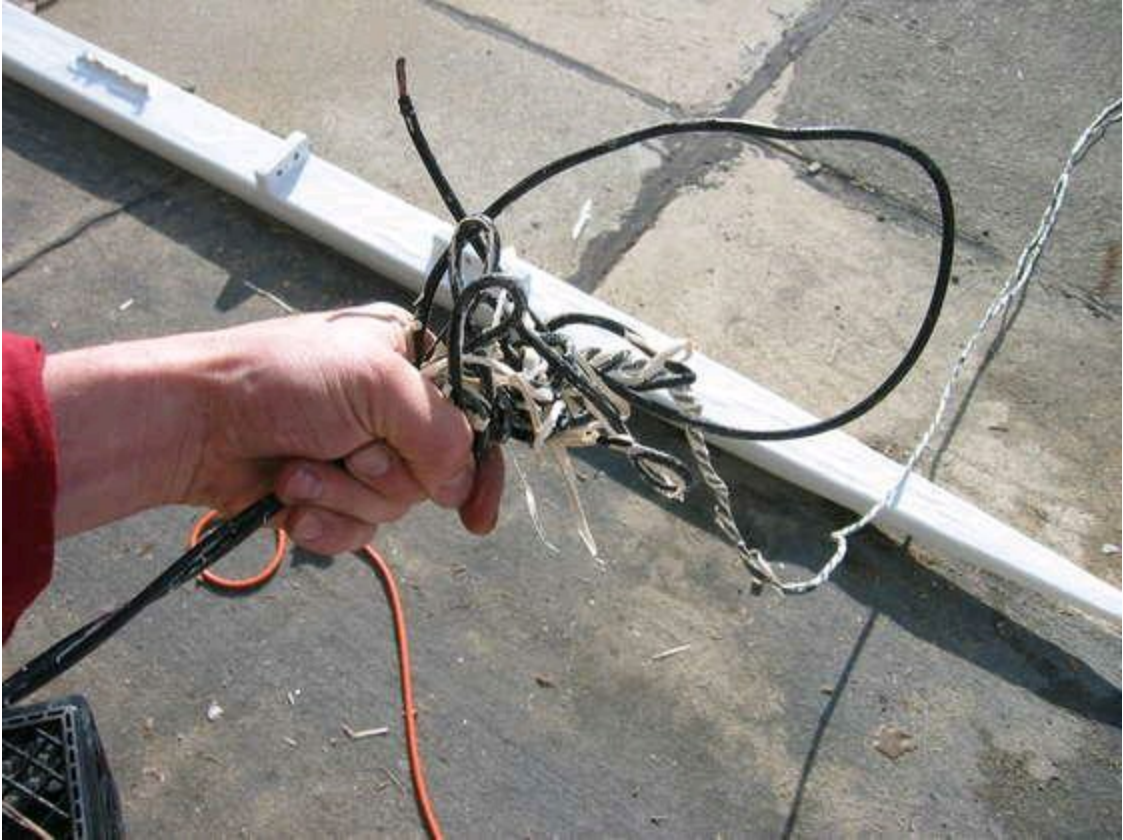


Image Notes

1. Star is skinning the 24 foot anaconda
2. this bike innertube creates tension for stripping away the wire jacket. the other end of the cable is C-clamped to the table.
3. Screwdriver pounded into the pavement temporarily.
4. Mr. Fireface is mobile now. A cozy glow wherever you're working.



Step 4: Wind the new transformer secondaries

We wound 20 turns of 10-gauge wire on each transformer. That's just about how much wire would fit into the available space. It took a little over 20 feet of wire each.

tip: draw tally marks on your table to keep track of the number of windings.

How does a transformer work?

The primary winding is an electromagnet connected to alternating current.

The humming magnetic field of the primary induces a current to flow in the secondary winding. If both windings have the same number of turns, the output voltage is the same as the input.

(minus a smidgin due to eddy currents, resistance, etc.)

If the secondary has more turns than the input, its output voltage is higher. That's the type of transformer you started out with.

$$\text{OUTPUT VOLTAGE} = \text{INPUT VOLTAGE} * (\text{NUMBER OF SECONDARY TURNS}) / (\text{NUMBER OF PRIMARY TURNS})$$

Our primary has 100 turns and gets connected to 100 volts AC. We're winding 20 turns on the secondary, so we'll get about 20 volts out.

The available POWER STAYS THE SAME regardless of what the output VOLTAGE is.

$$\text{POWER (WATTS)} = \text{AMPS} * \text{VOLTS}$$

If the primary is made take 1000 watts (100 volts * 10 amps) out of the wall, we'll be able to take 1000 watts out of the secondary. With 1/5 of the windings, we can draw 50 amps out of the secondary.

That's the cartoon version with play numbers anyway.

Over here in our shed full of reality we've got two of these beasts in series and plan to short the outputs through a welding rod like Jennifer Beals.

Let's just say we're going to pull a whole lot of amps, which is why we need to wind our secondary with such thick wire.

The copper conductor in ten-gauge wire happens to be 1/10" (0.1") in diameter.

Here's a table of [conductor diameter, guage, and current rating](#).





Image Notes

1. use a flat bar as a wedge to make space for more windings.

Step 5: Schematic

It's a pretty simple circuit.

In fact there's nothing in it except wire!

We'll take two transformers and wind low-voltage secondary windings on them with thick wire.

We'll put the secondaries in series with our welding rod and workpiece.

We'll plug the primaries into the wall.

I really like the way aaawelder put it: "do not include yourself in this circuit"

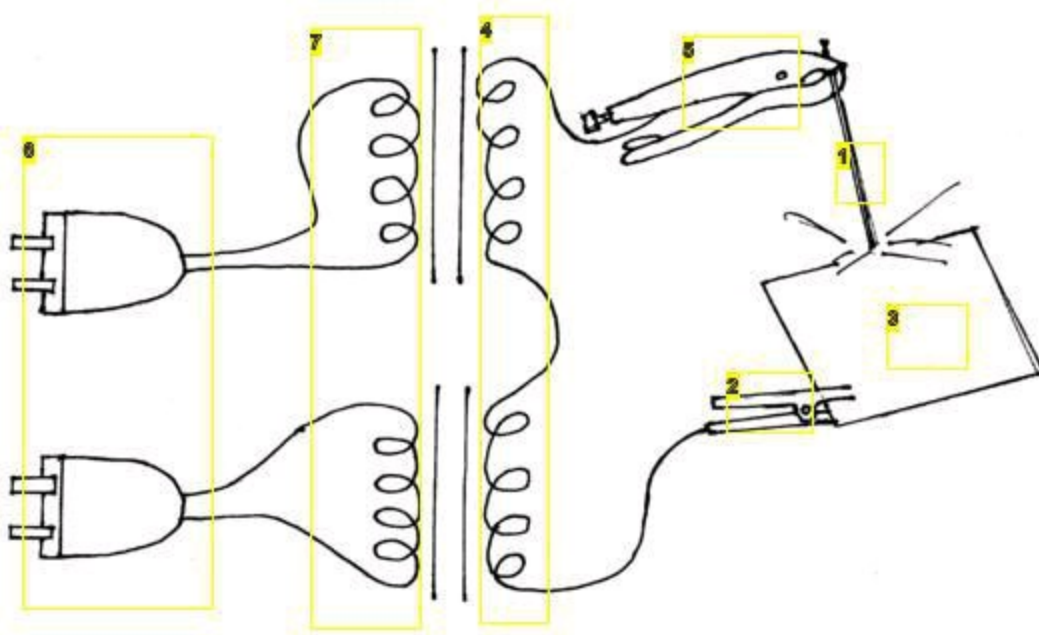


Image Notes

1. welding rod
2. ground clamp
3. workpiece
4. New 10 guage low-voltage high current secondary windings
5. electrode holder
6. To use this unit on 220 volts put the primaries in series rather than parallel as

shown here

7. existing primary windings

Step 6: Wire your two transformers together

Why do we use two transformers?

Just one of these isn't big enough to make a really juicy welder.

If you happen to find a big enough transformer somewhere, feel free to use that.

Here's how to hook up two transformers.

First we wire both primary windings in parallel to the wall cord.

Then we wire the thick secondaries in series so they both "Push and pull" in the same direction.



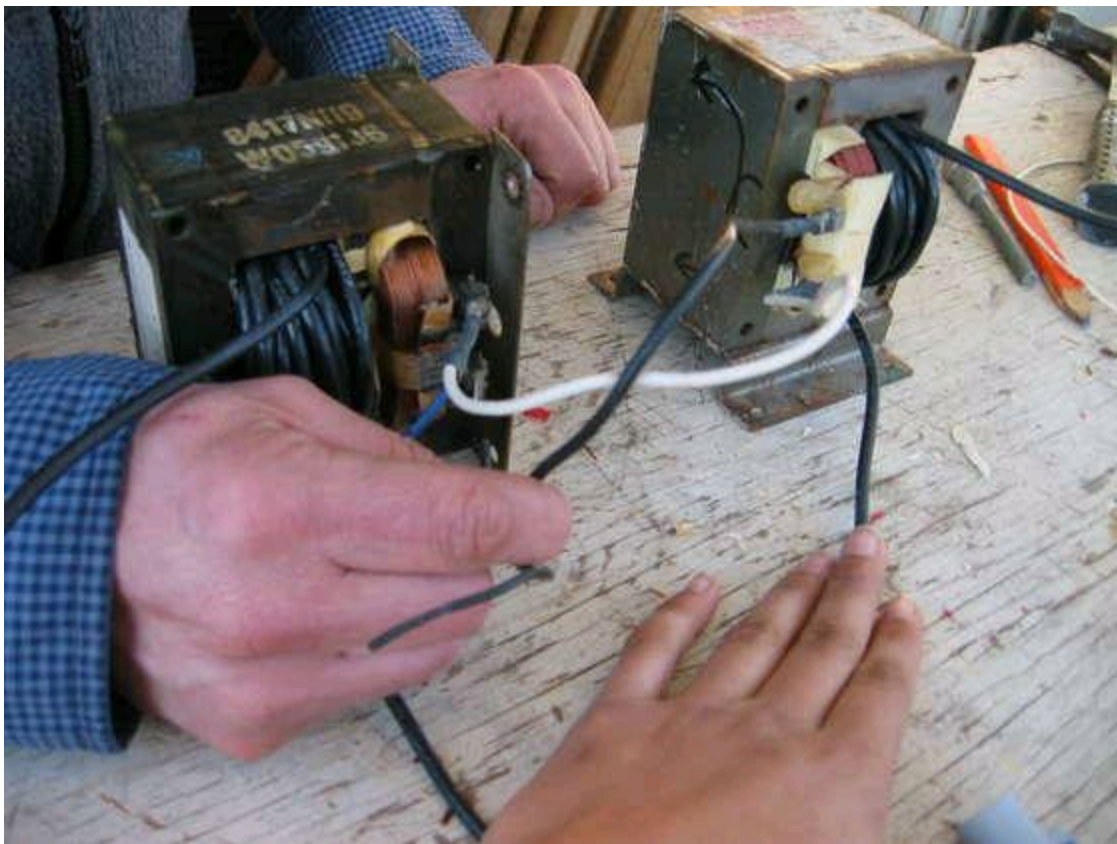
CLICK TO PLAY VIDEO 



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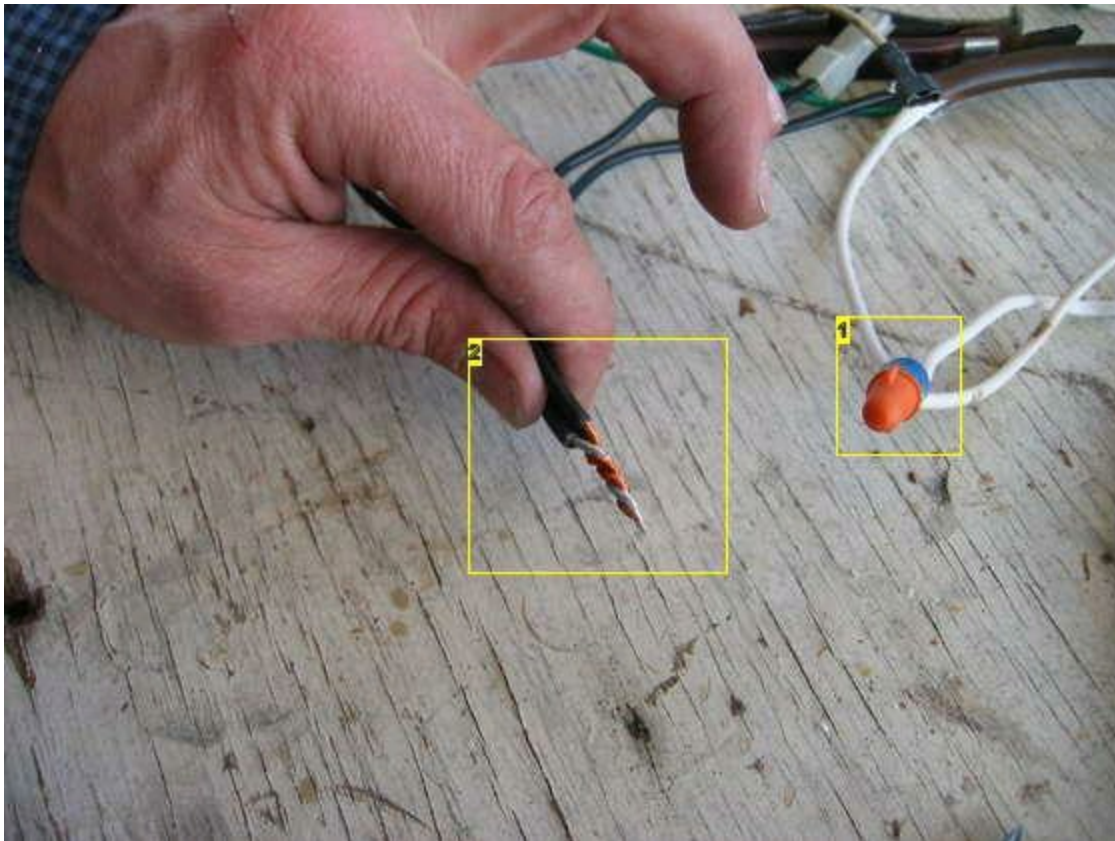


Image Notes

1. Wire Nut
2. Three wires twisted together

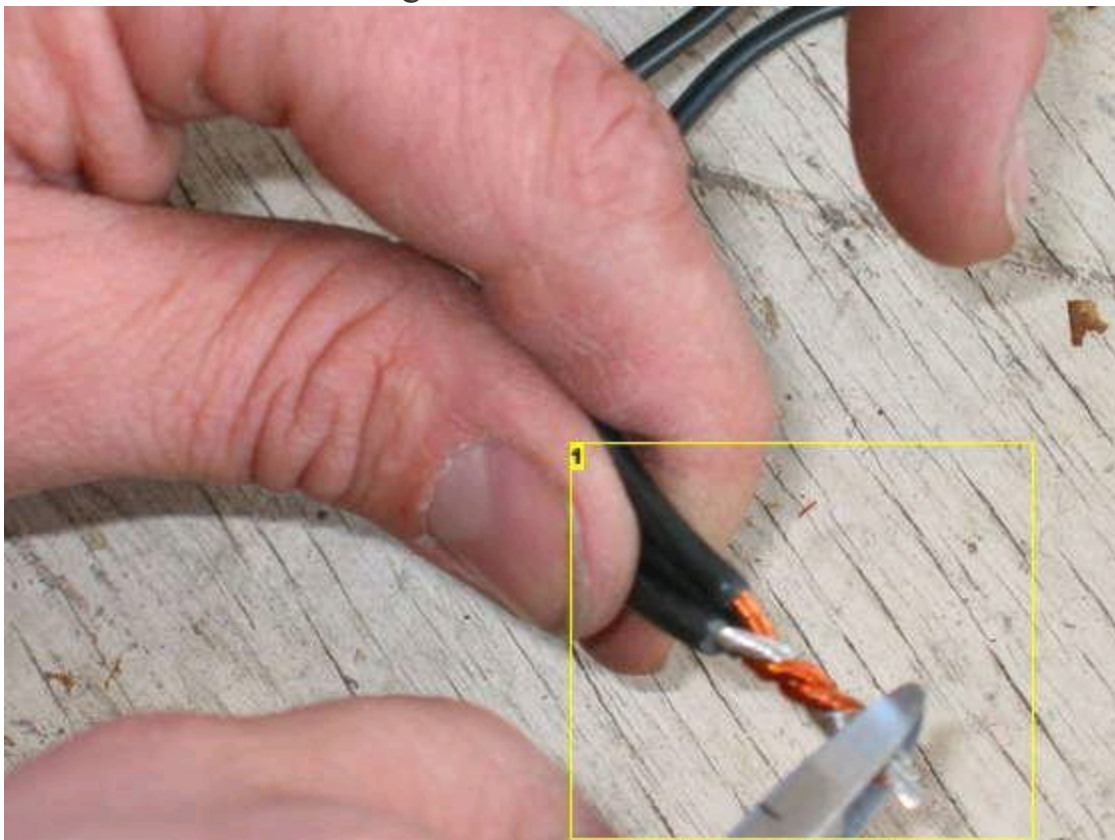


Image Notes

1. If the bare part is too long the wire nut won't cover it. If the end is too pointy the threads inside the wire nut might not grip it well. Cut it square if you're concerned.

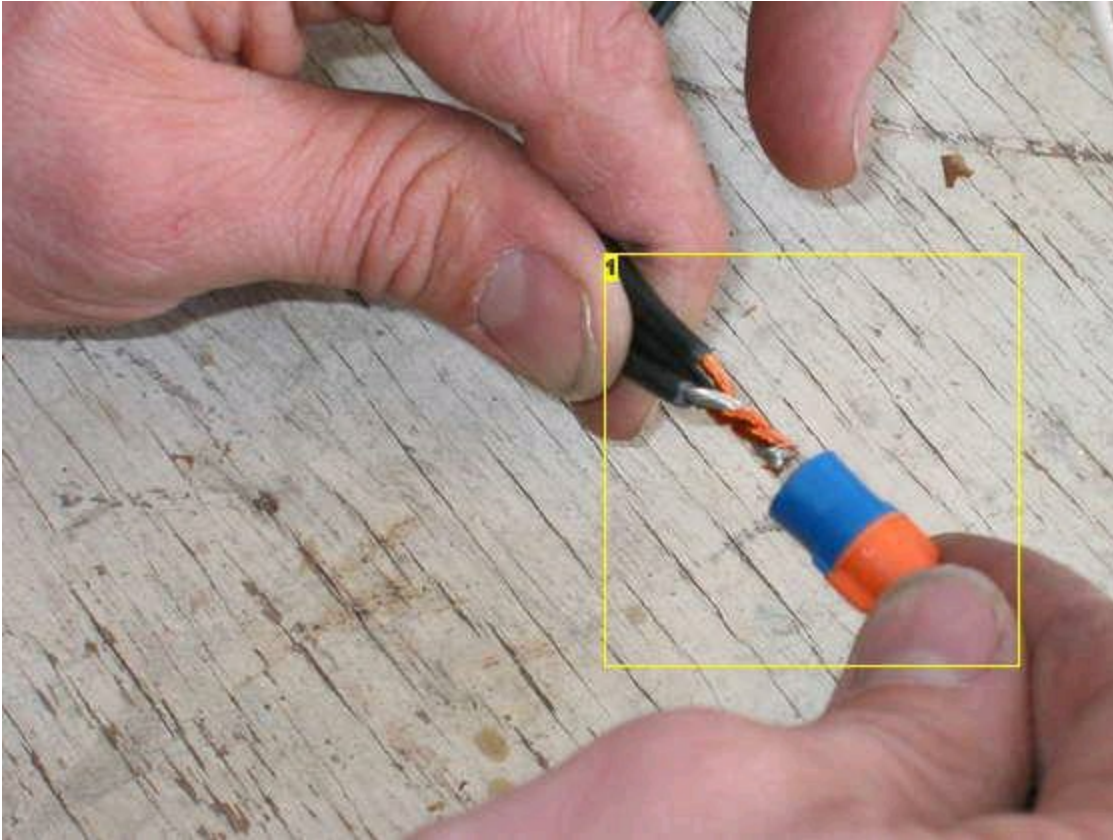
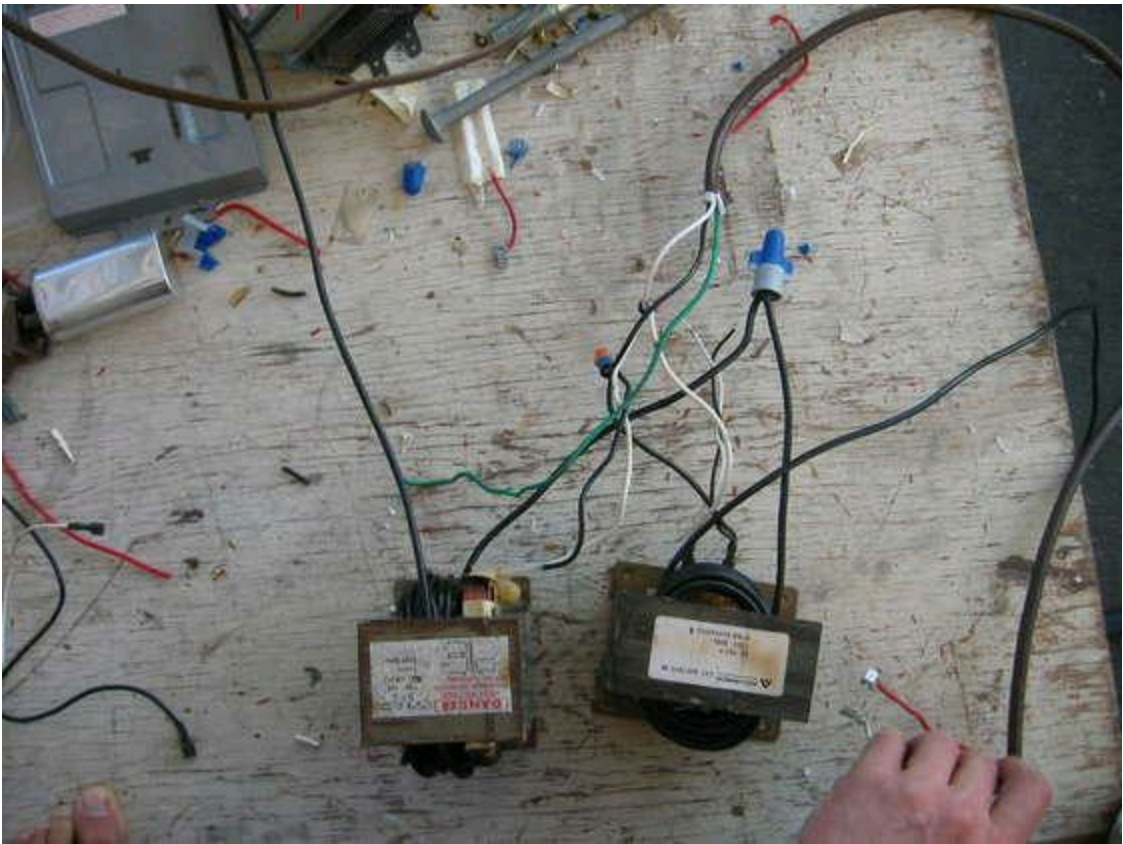


Image Notes

1. To everything turn turn turn there is a season turn turn turn and a wirenut for every purpose such as cover twisted wire ends and shoot through conduit-compressed-air guns at rats.





Step 7: Test

Get out yer voltmeter:

Here's the test to make sure the secondaries are both pushing the same direction.

Our two secondaries in series produce 38volts AC with no load. That seems about right.

If they'd phased wrong it could have been fixed by reversing the wiring to any winding.

Where Tim says "out of phase" in the video, he means "in phase". That is, the center tap **should** be less than the outer two leads, and if things weren't that way, the transformers would be fighting each other, or phased wrong.





Image Notes

1. Non conducting shoes. Not standing in a puddle of water.



Image Notes

1. Electrical safety - keep one hand behind your back or in pocket so you don't accidentally short across your heart by carelessly grabbing two wires.

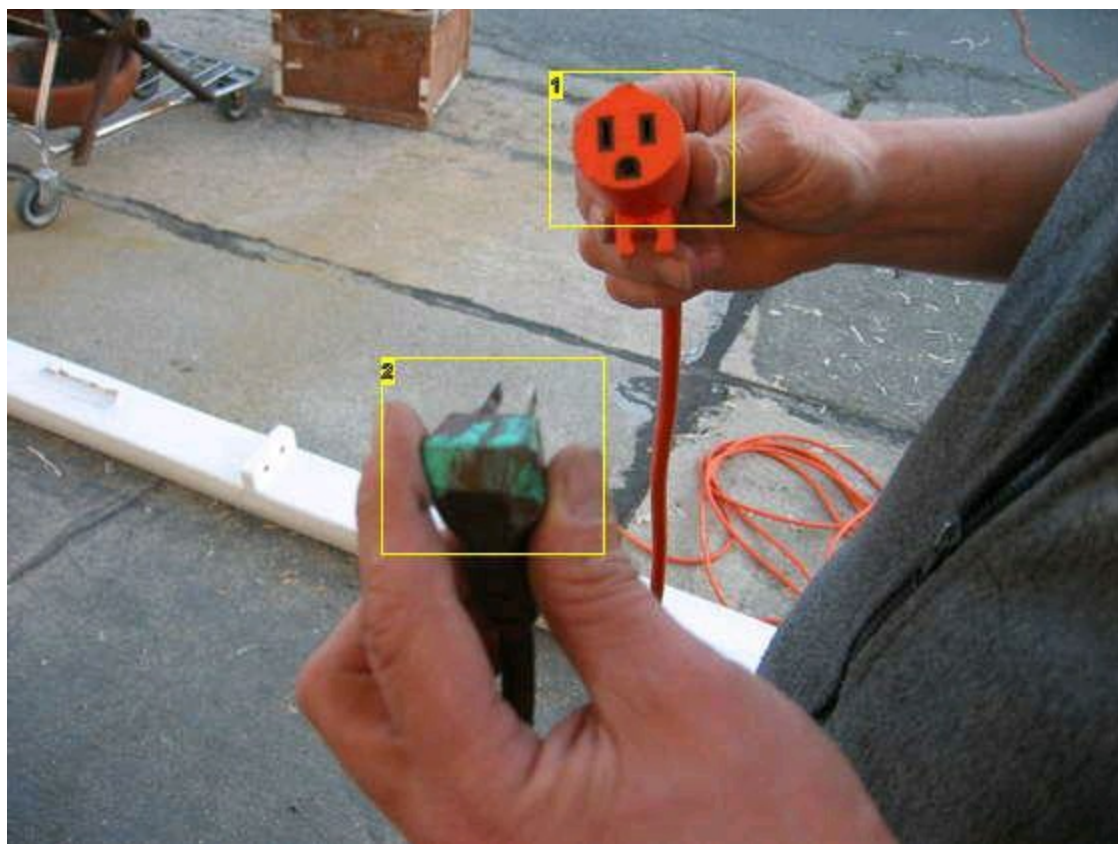


Image Notes

1. Hi! I'm MR. Baby tongue fun toy!
2. Come here often?

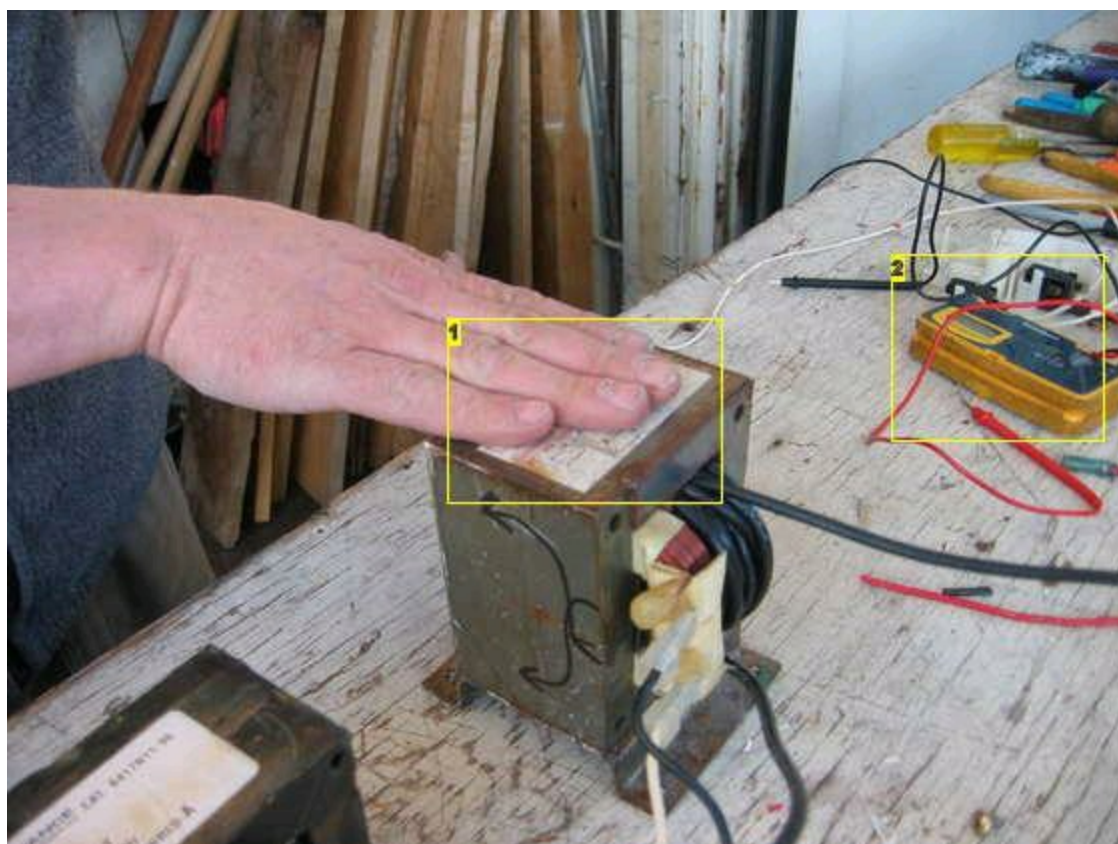


Image Notes

1. check the heat - these didn't really get warm, which is a great sign!
2. Radioshack autoranging multimeter. The best deal I know of for a little meter. Why hasn't progress happened?

Step 8: Weld

holy cow, it works!

We wanted to add a series inductor to give the unit more "inertia", but it didn't matter!

Here's [Tim](#) welding with some of those.



Built your welder, but not sure how to weld? Check out the instructional videos on youtube - search "how to arc weld". They're very good.

Here's [Star](#) striking an arc.

It welds great with these thin 1/16" 6013 rods. Even better with 3/32" 6013 rods.

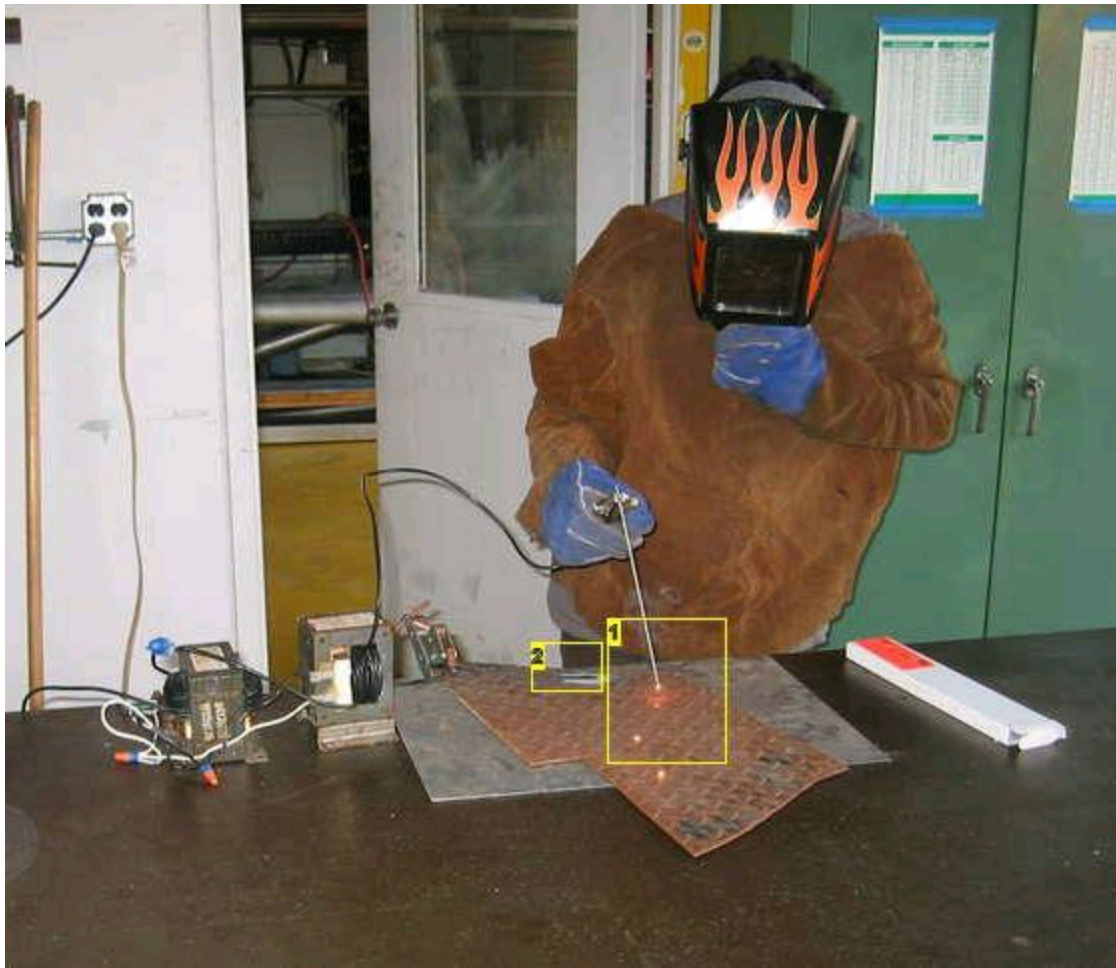


Image Notes

1. scratch start technique
2. Awesome first weld bead!

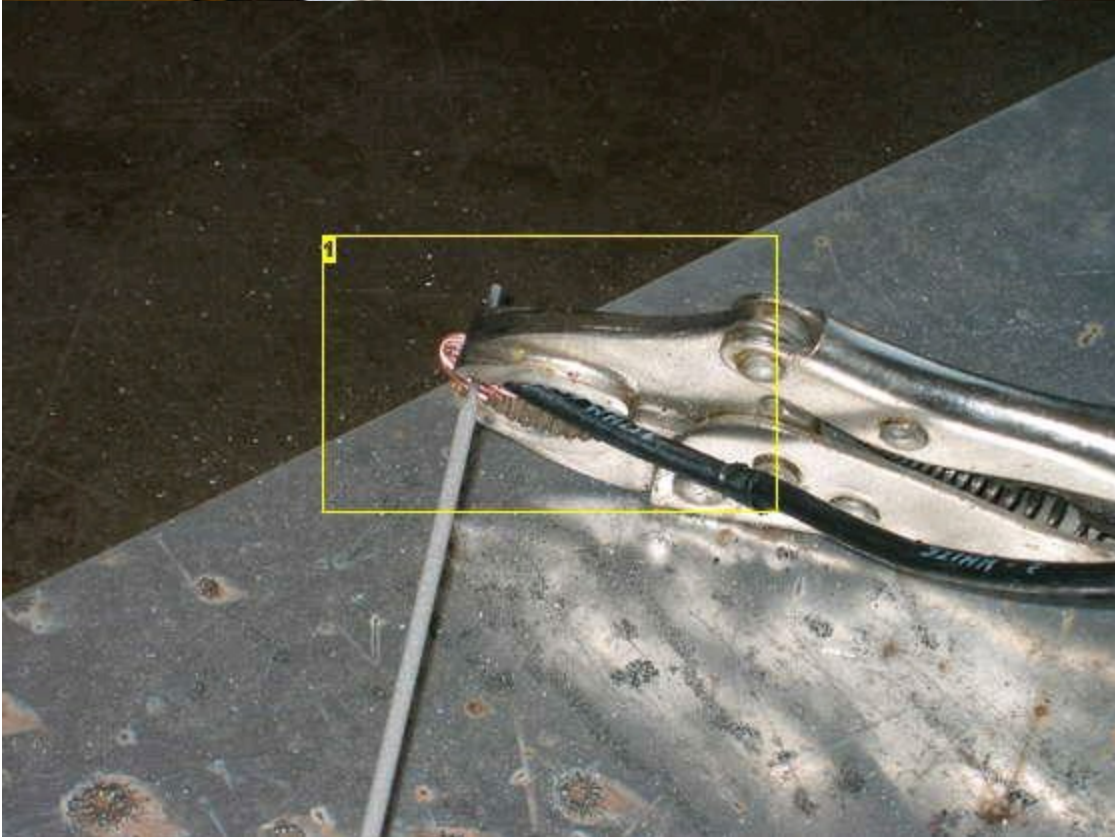


Image Notes

1. electrical connection, stick, and vice grip to hold it all together (all electrically active)



Image Notes

1. ground clamp

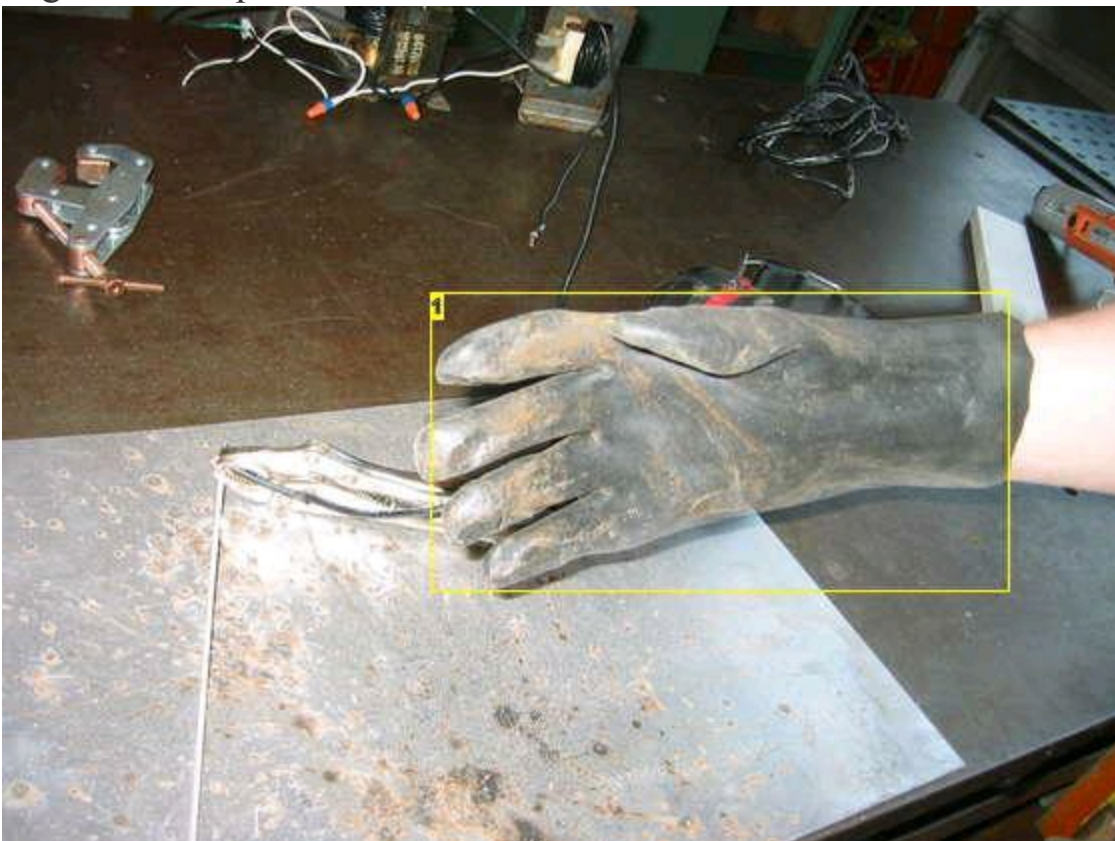


Image Notes

1. insulated glove for grabbing the electrically active vice grip



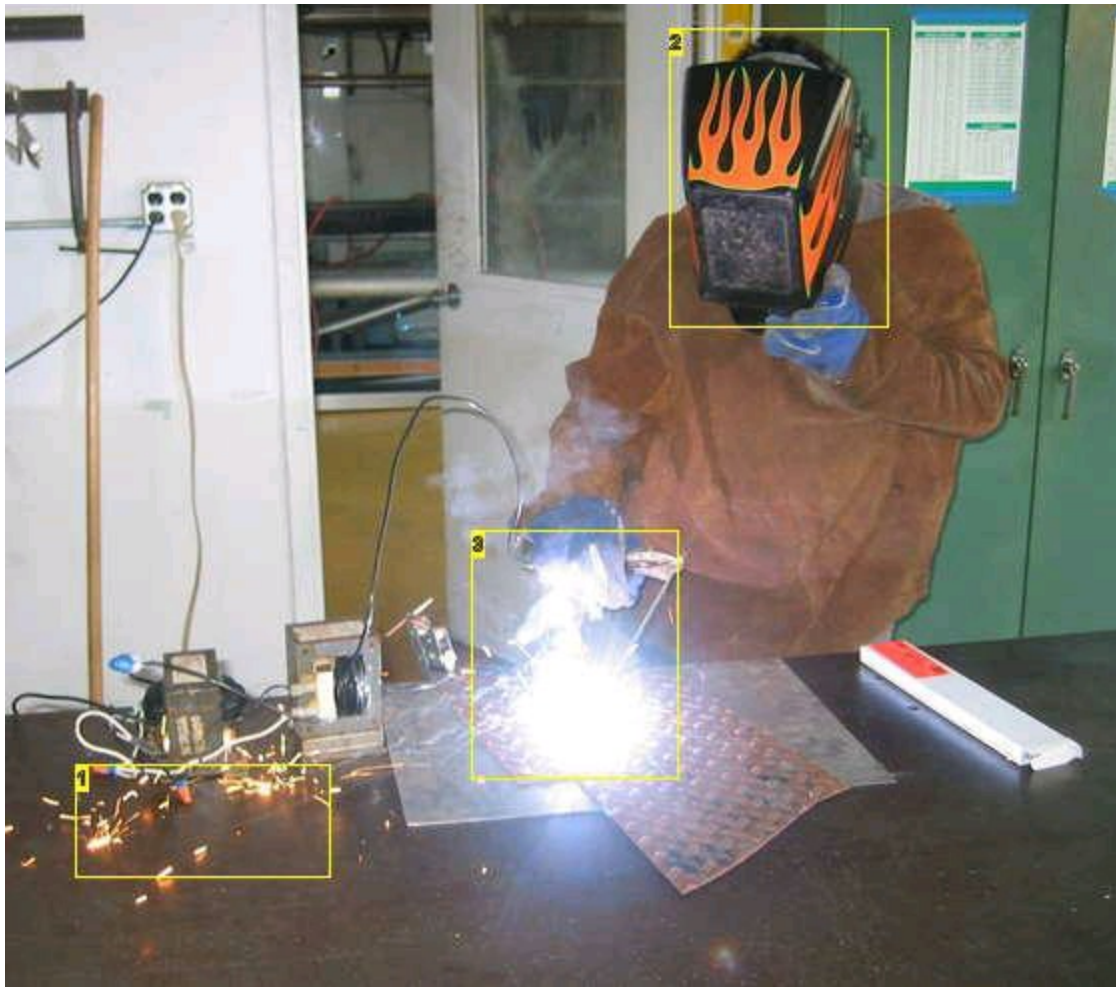


Image Notes

1. sparks! The good kind, from the weld, not the bad kind from the welder.
2. me welding
3. call me Flashdance.

Step 9: Thick Rod Test

Those skinny 1/16" electrodes cost about twice as much as thicker ones.

We wanted to see how our welder works with thicker electrodes.

The next size up is 3/32", but we got a box of 1/8" 6011 electrodes.

When we pulled one out of the box we both said "wow, that's thick".

We fired up our welder and I welded this bead across the diamond plate with 1/8" rod.

The arc was pretty short but it burned in well and felt pretty good once I got used to it. I had to shove it in a bit more than I'm used to to keep the arc going, but sticking wasn't a problem. I welded a long bead and used up more than half the rod without stopping. That's the long weld in this photo.

Then I set the "torch" in this plastic tub so it wouldn't short out to anything.

I checked the transformers, and they didn't even get warm!

3/32" rods are less likely than 1/8" to blow a circuitbreaker though. For your first welds get 3/32" 6013 rods.

6011 rods have thinner flux and make it easier to see what the metal of your weld is doing, but tend to spatter a bit more.

The next picture is for reference, from hobartwelders.com

Update 4/16/2008:

This is now my favorite welder. I made new leads for it from a pair of jumper cables. I left one alligator clamp on for a ground clamp, and added a [\\$6 electrode holder](#). I've taught a bunch of people to weld using it.

The next photo is [Ita welding for the first time, making an awning frame](#). That project was welded with this welder by total beginners using 3/32" 6013 rods. As you can see we have every other kind of welder, but the homemade ones are more fun.

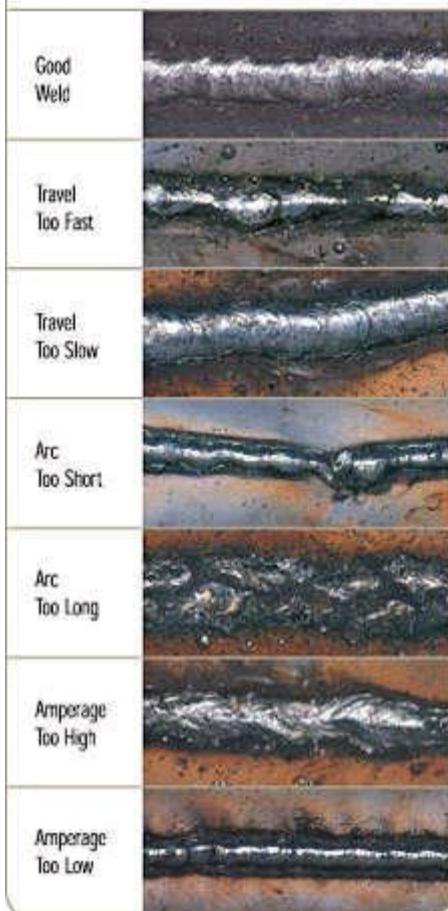


Image Notes

1. It burns back into the coating, making it easy to maintain enough distance.



Diagram 7:
Example of Good and Bad Stick Welds



Step 10: Welding Stainless Steel

We needed some brackets for [Solara's](#) mizzen mast.

So we went to the welding store and bought some 3/32" "Hobart Smootharc+ 316L - 16" stainless welding rods. They're only 12" long because stainless has high electrical resistance and they get really hot.

After much designing and sketching Victor, Kenny, and I cut, drilled, bent and welded these brackets. Very easy. When it cooled the flux went "tik" and fell off the weld. The dark area around the weld is soot from the flux. The welder could have handled much thicker rods due to stainless' high resistance and low thermal conductivity.

Important:

Use a fresh grinding wheel on stainless, or one that you only use on stainless.

You'll get rust if you use any abrasives that have been used on non-stainless steel. Same for the wrong wire brush. It will smear rustable iron on the stainless, and due to galvanic effects it'll rust quick if it gets damp.

Hooray! Where did I get the idea you needed TIG for stainless? Stick welds on stainless are just great!



Step 11: Dimmer Control and Welding Thin Wall Tubing

The welder was too hot for thin-walled tubing frames, I kept melting holes even with the 1/16" 6013 rods. So I plugged the welder into a variac dimmer and turned the power down about 30%.

That gave me very fine control over power. Marc Lander and I did some very nice welds as seen here. After a few we got good enough to do the same welds with 3/32" 6013 rods and no dimmer and not burn holes.

More tricks - I used my left hand to feed a piece of mig welding wire into the weld to add more metal in and soak up the heat. Here's Marc doing that. Any wire is fine for this, coathangers are traditional for muffler work. Sand off the paint first if you don't like fumes.

Stopping to eat lunch helped a lot also. Your welds won't be good when you're shaky and tired.

I got my variac for free, don't buy one for this, they cost as much as a welder.

A solid-state dimmer that's rated for inductive loads does the same thing and costs a lot less.

If you're feeling particularly fancy, you can add in your own scr-based switching circuitry to vary the power, like [this guy did](#) .



Image Notes

1. Darth Vader doing crafts with his lightsaber on the weekend

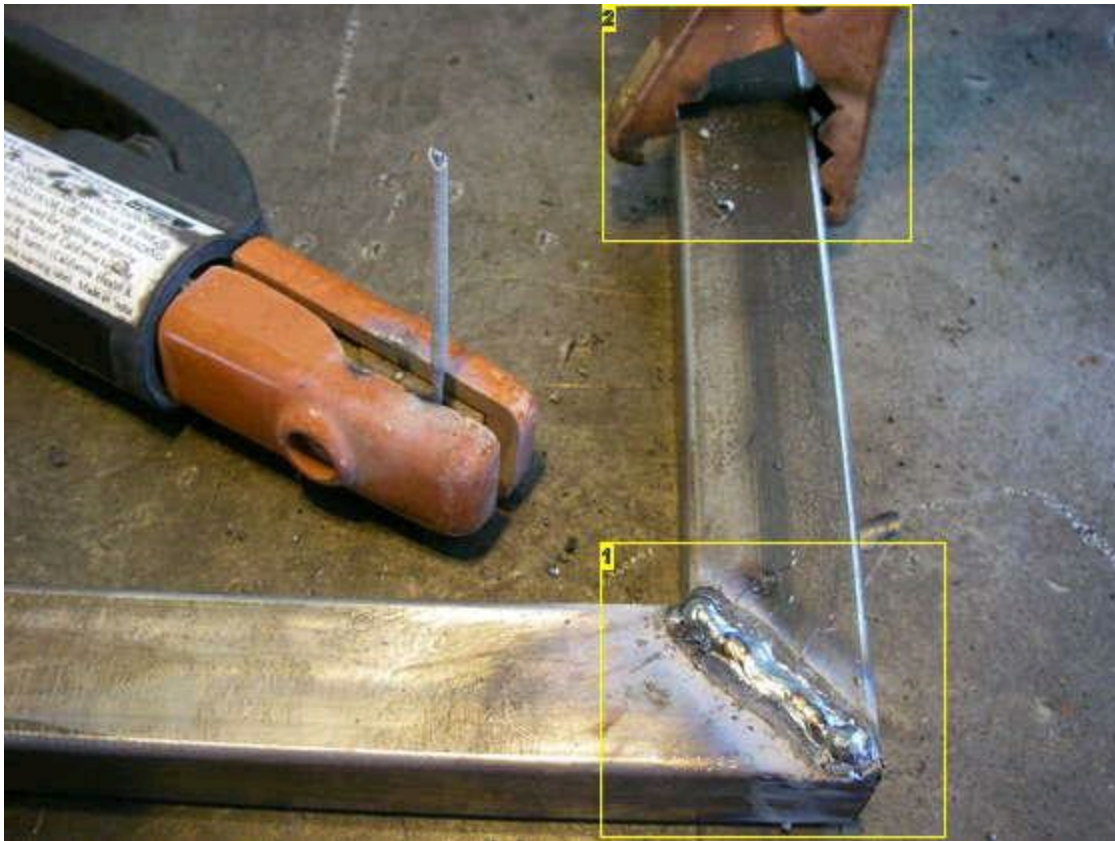


Image Notes

1. Nice Weld
2. automobile jumper cable ground clamp

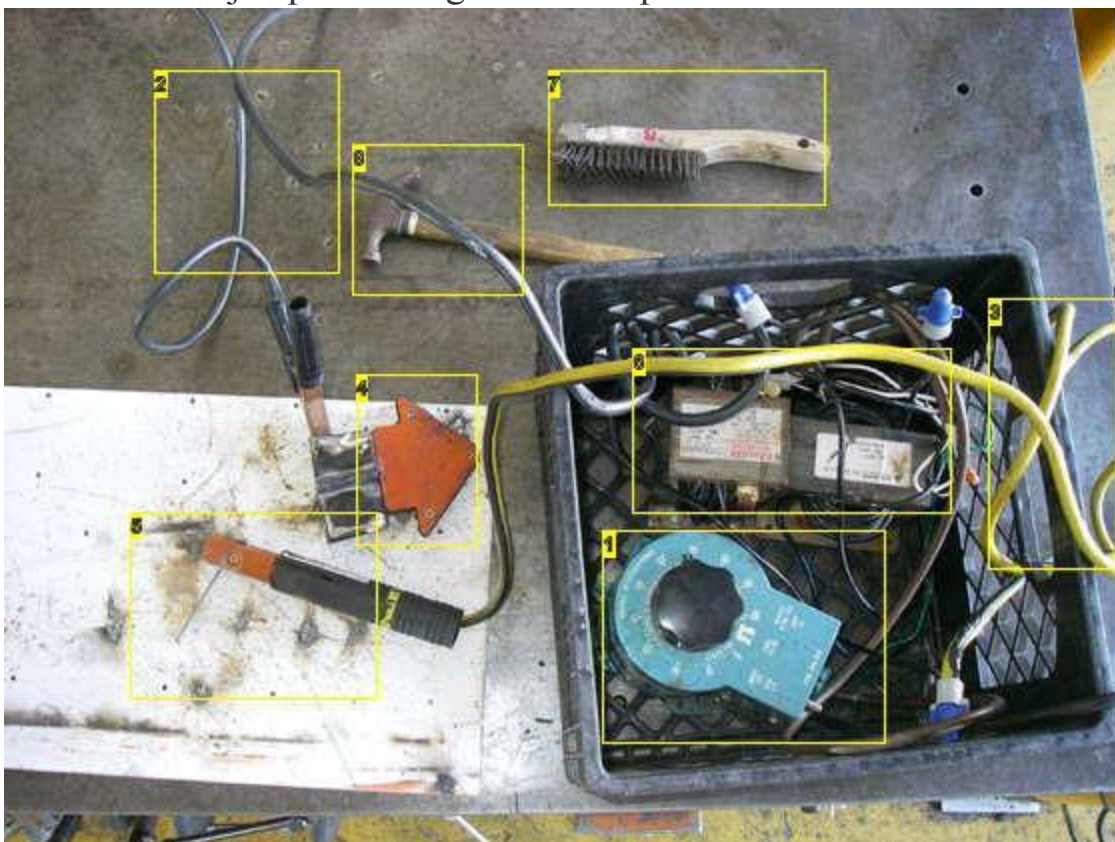


Image Notes

1. Mr. Variac a.k.a variable center-tapped autotransformer
2. Jumper cables
3. jumper cables. How many times in your life can you pull apart a zip-cord this big?
4. handy welding magnet
5. Handy non-vicegrip electrode holder should bring great joy to safety lovers everywhere
6. rewind microwave transformers
7. Your pal ms. Wire Brush. Brush rust away before welding, brush flux away after chipping.
8. Your pal ms. Hammer. Use to chip flux and peen the weld to reduce stress from weld freeze contraction

Step 12: Other Welders

Folks have sent me a few photos and videos of welders they've built off of this instructable. I want you to be able to see them too, so here they are!

Here's a video I got from Paul du Buf, of the Netherlands (nice case, Paul!)



[Cheyyne](#) said:

Hey there, here's my welder based on your instructabletion. It output

[llamafur](#) followed with:

Heres another one, same basic welder, but its housed in a .50 cal amr



Image Notes

1. llamafur's welder



Image Notes

1. llamafur's welder



Image Notes

1. this case is metal, so it should be connected to ground.
2. llamafur's welder



Image Notes

1. llamafur's welder

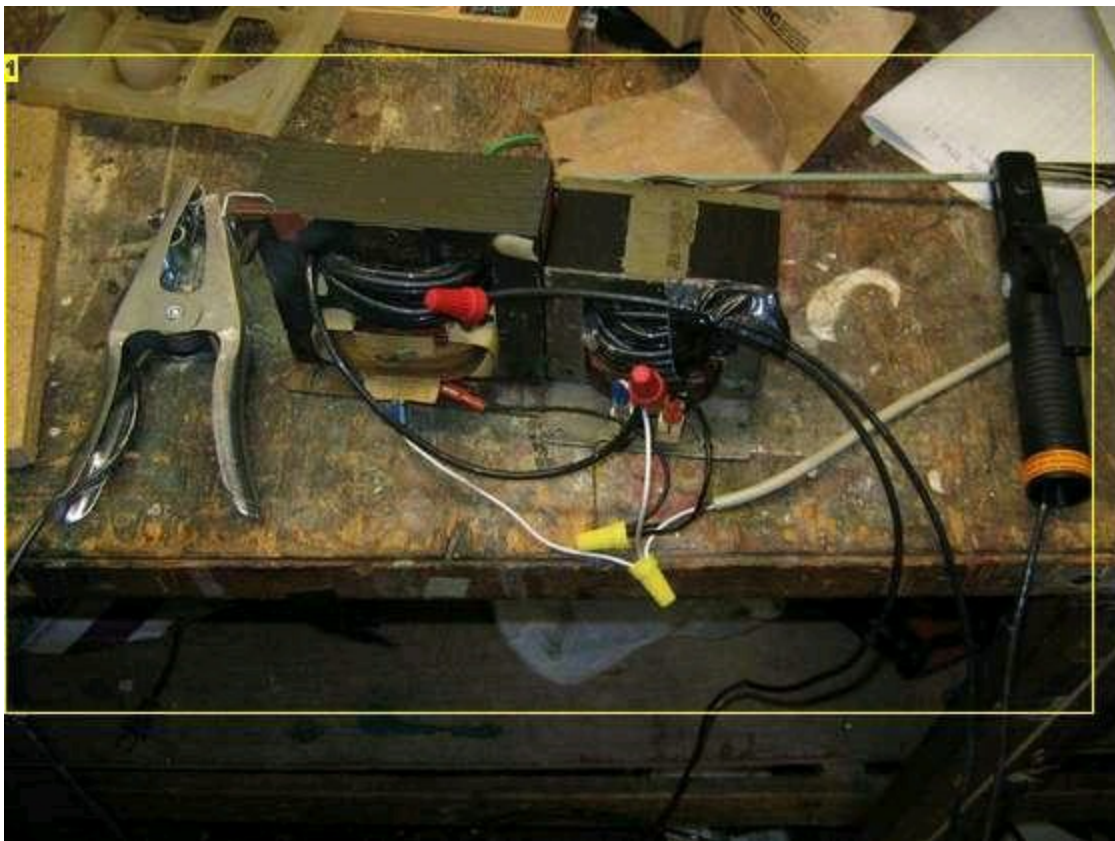


Image Notes

1. Cheyyne's welder



Image Notes

1. Cheyyne's welder

Related Instructables



[Cheap Welding for Punks](#) by [TimAnderson](#)



[Weld a Spoon Flower!](#) by [blrplt1](#)



[Batteries + Jumpercables = DC Welder](#) by [TimAnderson](#)



[Homemade Spot Welder](#) by [jds1969](#)



[Spool Gun Handheld Wirefeed Welder Powered by Car Batteries](#) by [TimAnderson](#)



[Very Low Cost Sheet Metal Spot Welder \(Portable & Convenient\)](#) by [mrjohngoh](#)



[Small 110 volt arc welder \(NYDG\)](#) by [Kdemon](#)



[Microwave oven transformer welder.](#) by [Grimarr](#)



How To Measure the Speed of Light... Using Chocolate!

Published by [bradpowers](#) on June 13, 2008

Intro: How To Measure the Speed of Light... Using Chocolate!

In this Instructable, the first in a series using the book [How to Fossilize Your Hamster And Other Amazing Experiments for the Armchair Scientist](#) as inspiration, we use a bar of chocolate to measure the speed of light.

What you'll need:

A bar of chocolate, actually, get three, that way you know you'll actually get to do the experiment! (The longer the bar of chocolate, the better)

A microwave

A metric ruler

You

Safety Glasses (not that this is dangerous, it just adds awesome factor to any experiment)

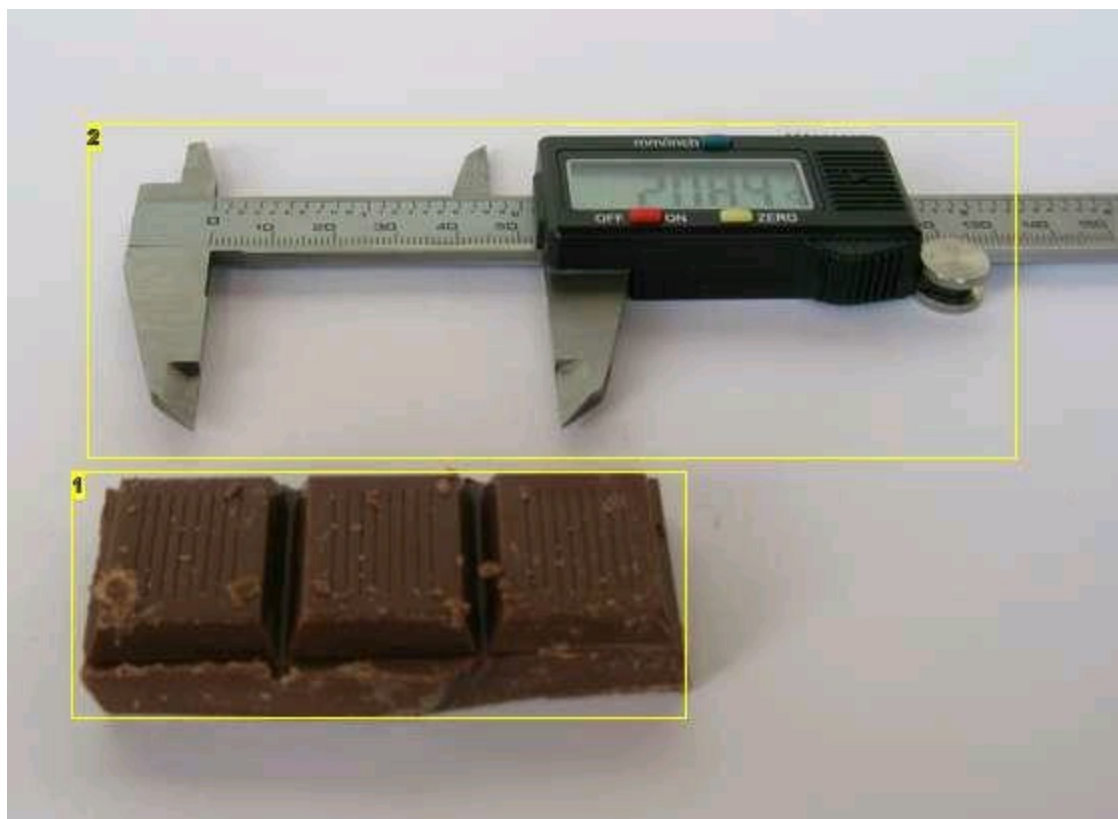


Image Notes

1. mmmm, chocolate.
2. mmmmm, measuring.

Step 1: Eat Some Chocolate!

You know you want to. You don't have to smear it all over your face though. In fact, I don't recommend it.

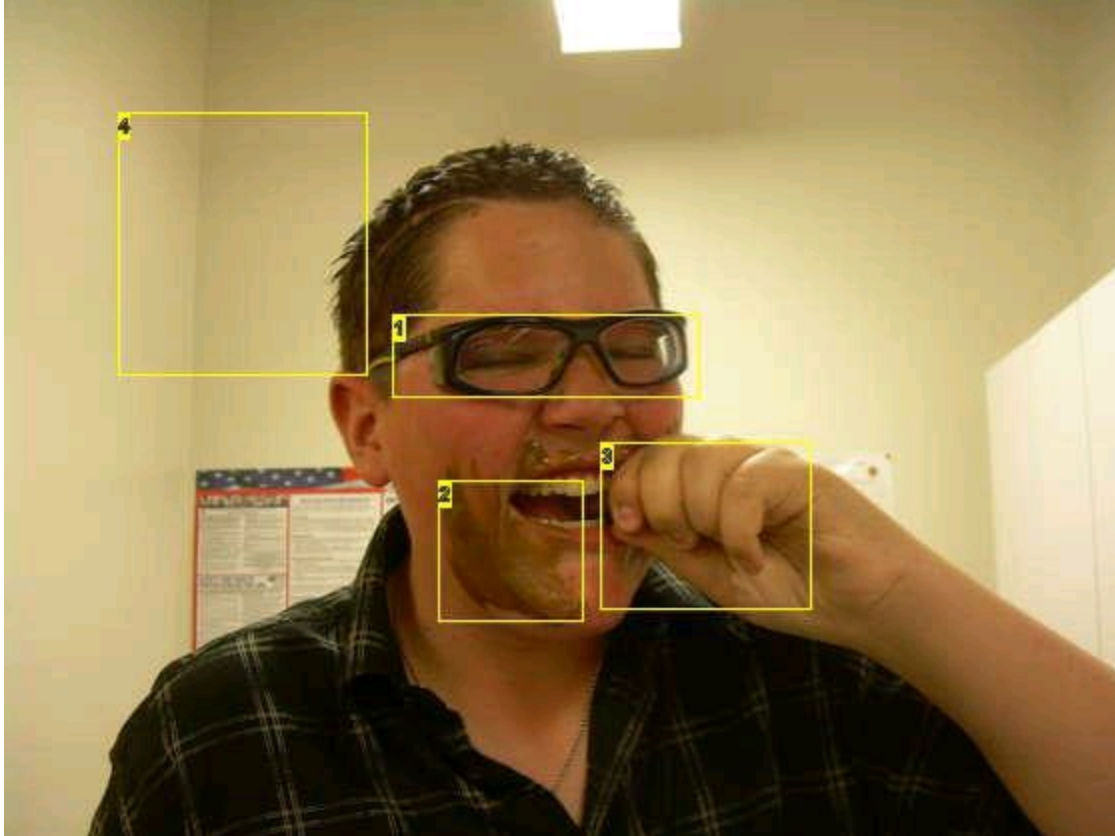


Image Notes

1. Note the Safety Glasses, adds credibility to any project.
2. Entirely Unnecessary
3. mmmmmm, chocolate!
4. mmm, this chocolate tastes like the speed of light!

Step 2: To the microwave!!!

Remove the rotating tray thingy from your microwave, we don't want the chocolate to cook evenly.



Step 3: Zap the chocolate

Now, place the bar of chocolate in the microwave. Turn on the microwave, and wait for pools of chocolate to form, then turn off the microwave. It should take about 40 seconds. I'll wait. Don't overcook the chocolate, it doesn't smell so good.

Step 4: Measure

Now, take out the chocolate, and measure from "hot spot" to "hot spot". A "hot spot" is where the chocolate is starting to melt, or is more melted than the rest of the chocolate. Write the measurement down. Seriously. Do it.

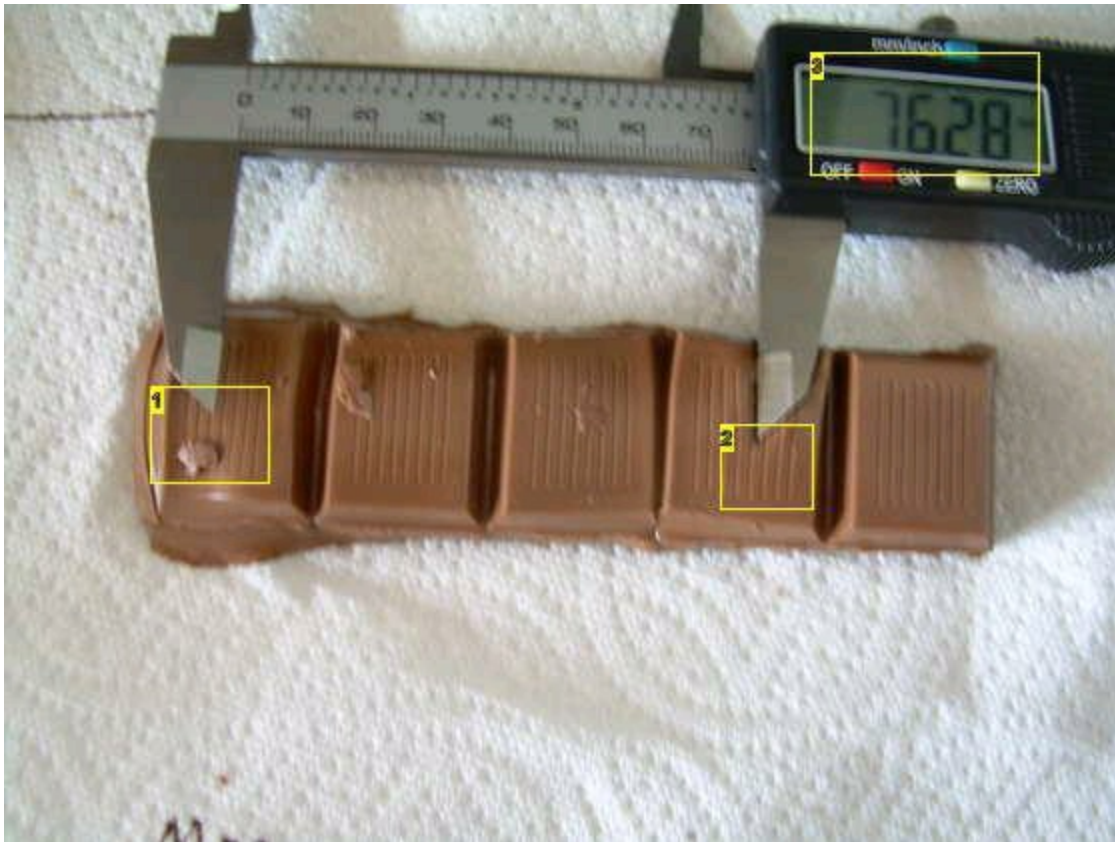


Image Notes

1. This area looks like a hot spot.
2. So does this area.
3. $76.28 \text{ mm} = 7.628 \text{ cm}$

Step 5: Now for the mathy stuff.

Ok, now that we know the distance between hot spots, we'll use some math, and some science, and some more math to figure out the speed of light. First, the distance that we measured represents the half-wavelength of the waves being emitted by the microwave (according to the book). To find the wavelength of the microwaves, we multiply by two. In my example, that gives us a wavelength of

$$7.628 \text{ cm} * 2 = 15.256 \text{ cm}$$

Now, since the speed of light is equal to the wavelength times the frequency, we can figure out the speed of light. But we don't know the frequency of the microwaves. Apparently, most microwaves operate at 2.45 gigahertz, or 2,450,000,000 Hz. So, we take the the product of the wavelength and the frequency:

$15.256 \text{ cm} * 2,450,000,000 \text{ Hz} = 37,377,200,000 \text{ cm/s}$ which, given that we are doing this in a kitchen (and a small error our measurements are multiplied by 4,900,000,000), is shockingly close to the actual speed of light, which is 29,979,245,800 cm/s, or, as it is typically defined, 299,792,458 meters per second.

Step 6: Iterate

All good scientists know that repeating an experiment is good for making sure your results are statistically relevant, so do it again. And again. Eat some chocolate. Have Fun!

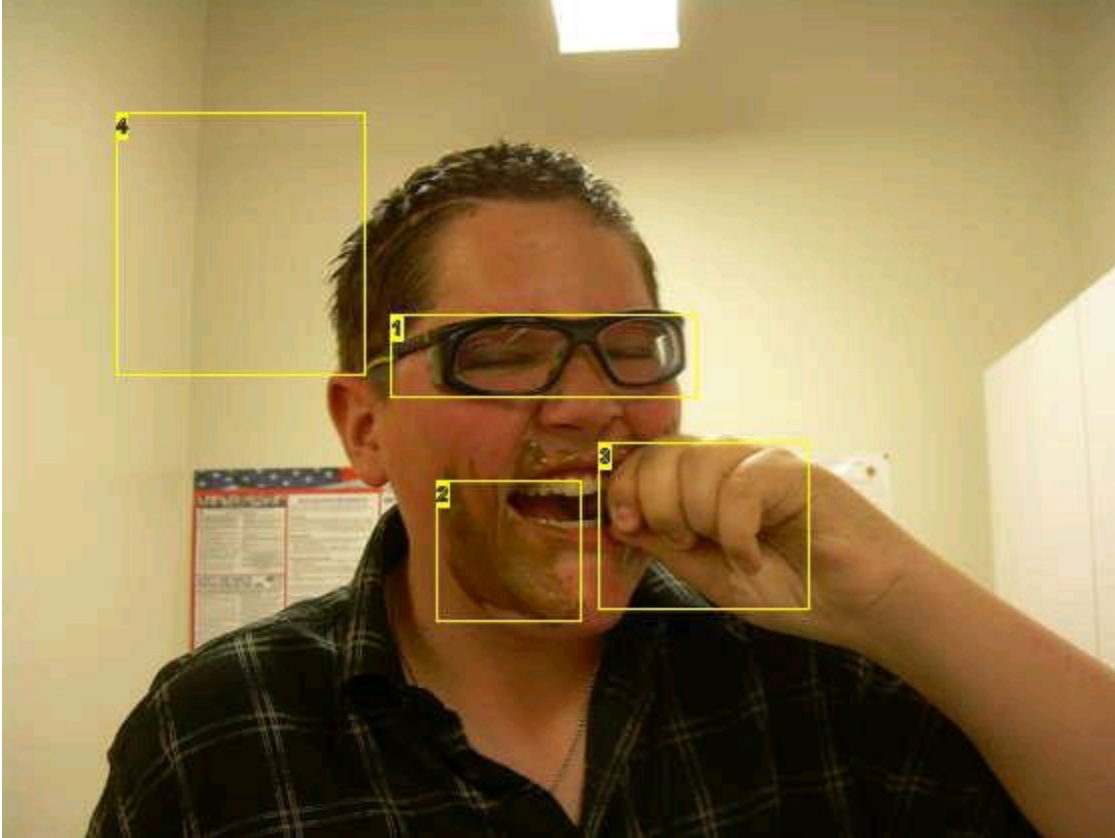


Image Notes

1. Note the Safety Glasses, adds credibility to any project.
2. Entirely Unnecessary
3. mmmmmm, chocolate!
4. mmm, this chocolate tastes like the speed of light!

Related Instructables



[Blueberry Chocolate Chip Pancakes](#) by [randofo](#)



[Chocolate Shake](#) by [starburst552](#)



[edible chocolate play dough](#) by [ItsYourDime](#)



[Double Chocolate Cheesecake with Chocolate Ganache](#) by [kitchenwench](#)



[Oatmeal walnut chocolate chip cookies](#) by [ruanet](#)



[Chocolate Chip Peanut Butter Fudge](#) by [mrigrsby](#)



[Custom made; shaped, flavoured and coloured chocolates.](#) by [thydzik](#)



[Homemade Flavored Marshmallows](#) by [cainunable](#)



How to make shell candles

Published by [Danger is my middle name](#) on September 23, 2010



Author Bio: [Danger is my middle name](#) ([author's website](#))

I'm just a girl who likes making stuff. If you have any questions or suggestions about any of my guides, feel free to e-mail!

Intro: How to make shell candles

I visited my friend at her little house on the ocean and collected a ton of these shells without really knowing what to do with them. When I got them home, I realized they were the perfect size and shape for some whimsical, romantic candles.

They are great for adding a pretty touch to any room and would make great centerpieces or favors at a wedding.



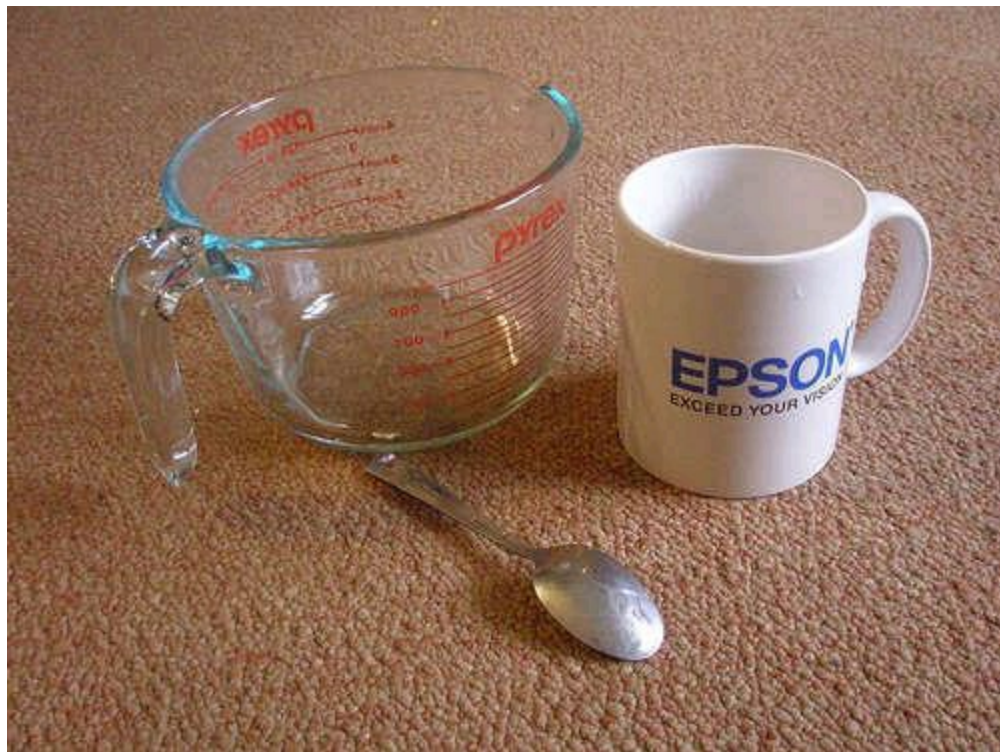


Step 1: Materials

You will need:

- large shells (you can probably buy them online or at your local craft store if you don't have access to a beach)
- wicks (craft store)
- wax of your choice (I used soy wax shavings since I live in a dorm and they melt in the microwave)
- bowl or cup for wax
- larger bowl for water to create double boiler effect
- spoon for stirring and pouring
- fragrance (soy doesn't hold on to scent very well, but I added some vanilla and lavender to different batches and it still smelled nice)





Step 2: Prepare shells

My shells were straight from the beach and still had sand in them. Wash them thoroughly and dry them very well. If there is water under the wax when you pour it in, the wax might not stay in the shell.





Step 3: Melt wax

This part is mostly trial and error. For the soy wax shavings, I filled the cup with them and filled the larger bowl with water and microwaved it for 1 minute at a time until the wax had melted into liquid.

Follow the directions for whatever kind of wax you use. Some may not be able to melt in the microwave.

Once it is mostly melted, I used the spoon to stir until all the checks were dissolved and to cool the wax slightly.



Step 4: Set wicks

Set your wicks in the shells wherever you want them, preferably in the deepest part of the shell for maximum burning time. Don't trim the wicks yet.





Step 5: Pour the wax

On a protected work surface, carefully pour the wax into the shells. It helps if you have the liquid wax in a cup with a spout to better direct the pouring. I just had it in a mug and it spilled a lot. This step helps to have a friend hold the shells steady or prop them on something since the bases are not completely flat.



Step 6: Finish and enjoy!

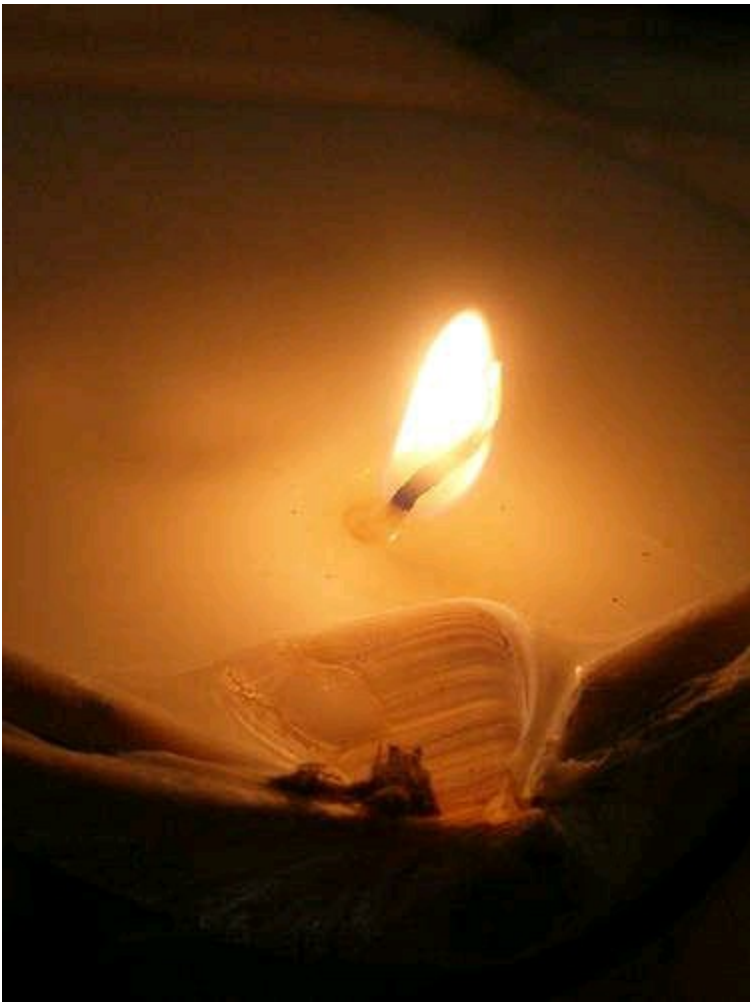
Once the wax has solidified, trim the wicks to about one quarter of an inch and clean off any wax that might have gotten on the back of the shell.

And you're done! Light your candles and enjoy the soothing ambiance!









Related Instructables



[Cheap Elegant Table Center piece with matching Candle](#) by [pyelitegamerro76](#)



[How to create Romantic touch in Wedding](#) by [creativegirlz](#)



[Shotgun Shell Candles](#) by [Sunbanks](#)



[Coconut candle holder](#) by [Modeo](#)



[Recycled Teacup Soy candle, natural and eco friendly](#) by [cheekysttich](#)



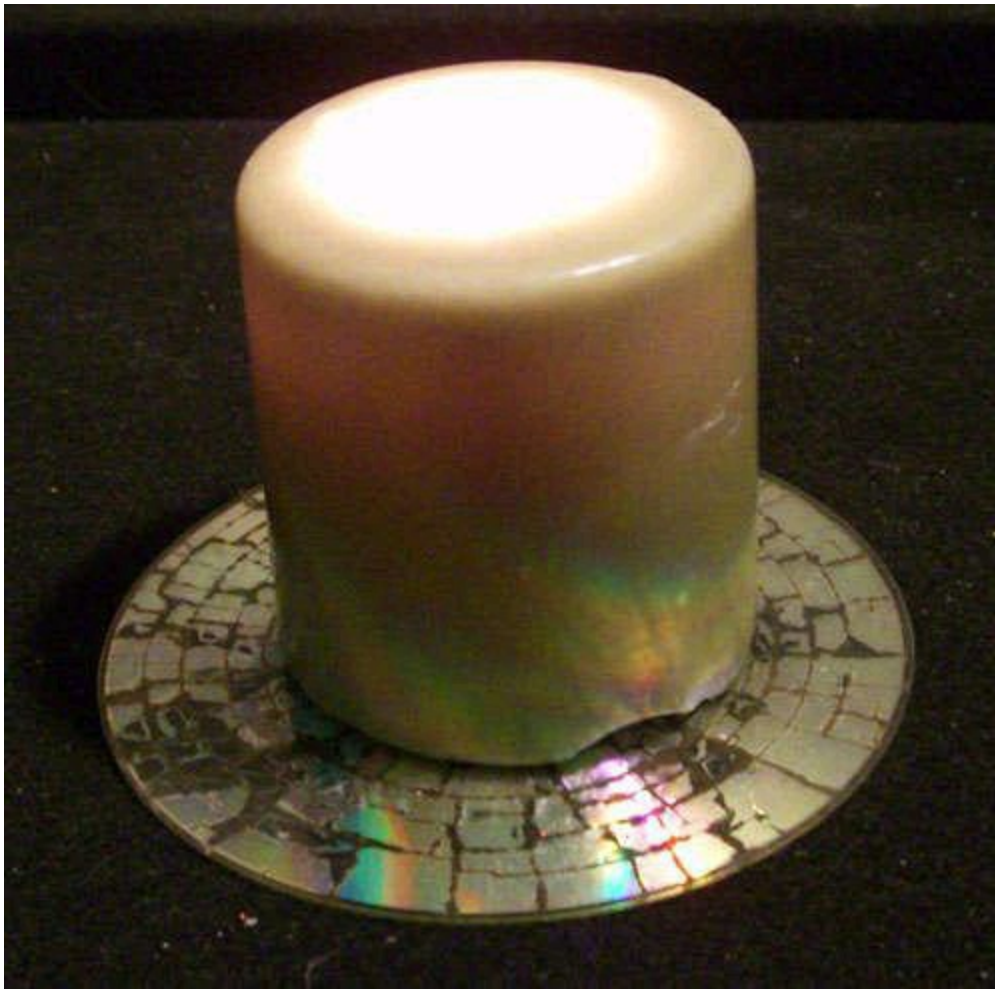
[Cheese Wax Tea Lights](#) by [glengilchrist](#)



[Pysanky - Ukrainian Egg Dying](#) by [esmecat](#)



[Cheap Fire Starters!](#) by [Captain Molo](#)



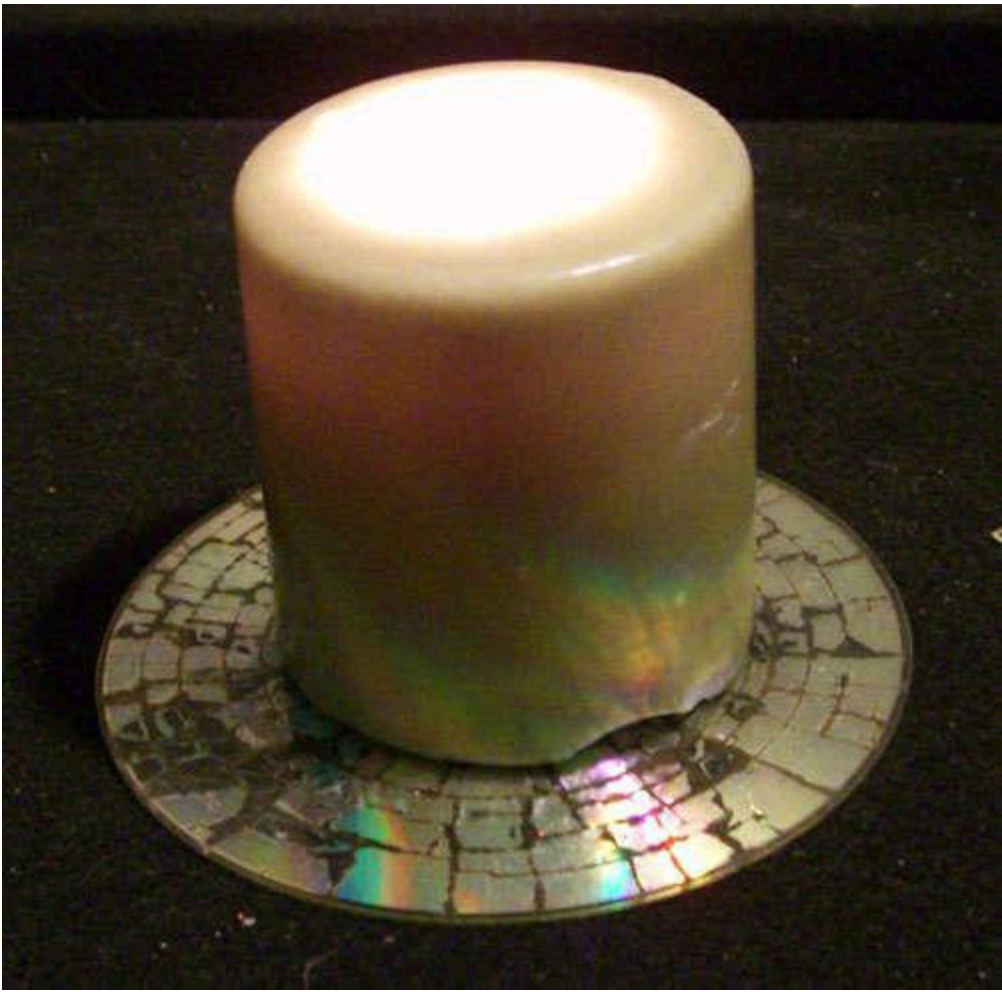
Microwaved CD Candle Holder

Published by [drumperry](#) on May 5, 2008

Intro: Microwaved CD Candle Holder

Everyone loves microwaving CD's and watching the nifty light show that ensues. Here's another excuse to do it.

I know this is kind of a dumb and easy instructable, but it's kind of fun, and it was a cheap way for me to decorate my apartment.



Step 1: Materials

A pillar candle

An old CD

A microwave

I've found that you can get really cheap candles at dollar stores and grocery outlets.



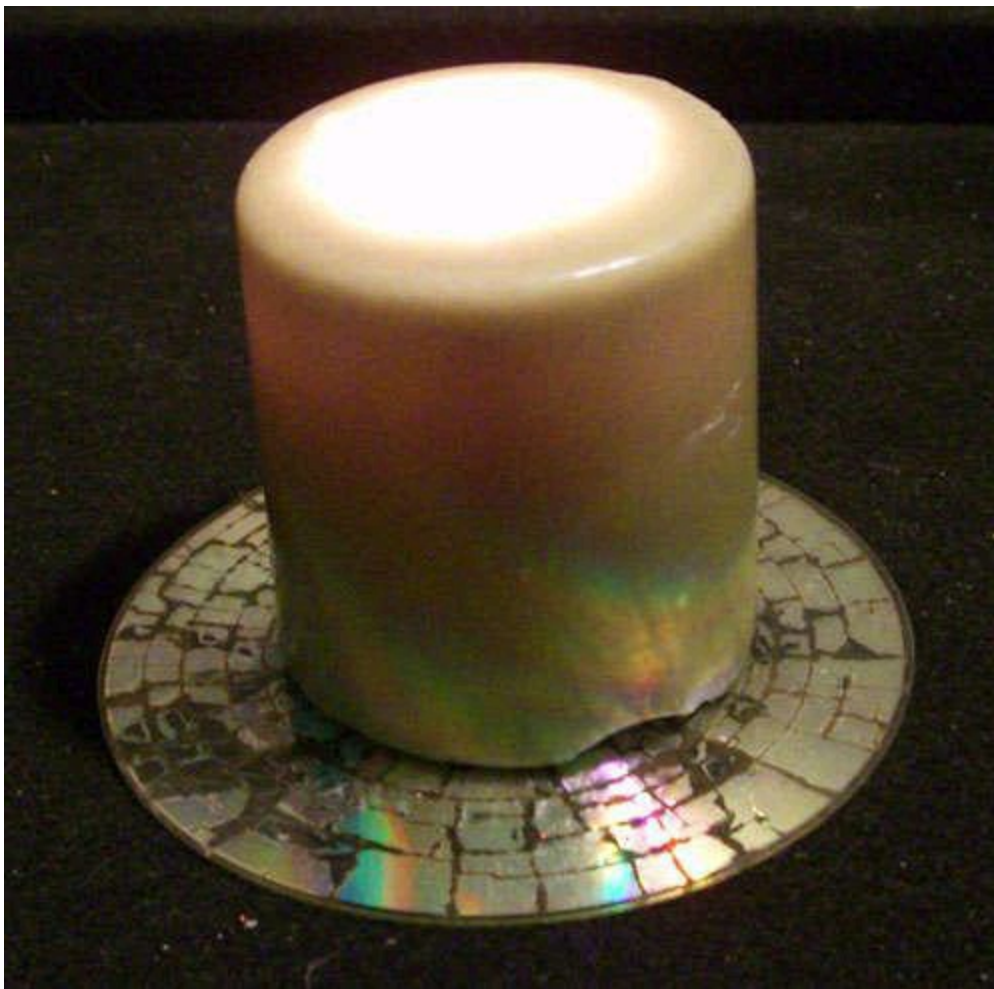
Step 2: Let's Make It!

1. Put the CD in your microwave.
2. Set it for **5 seconds** and press start.
3. Watch the cool light show and be easily amused.
4. Take the CD out and put a candle on top of it

That's it! Enjoy!

Disclaimer: Microwaving CD's is probably not good for your health or your microwave. Everyone does it anyway though. I'm not responsible for anything bad that happens.

Also, hot wax could probably melt a CD. Never leave a burning candle unattended.



Related Instructables



[Microwave Candlemaking](#) by [zorgberg](#)



[Portable Power Outage Candle](#) by [NoFiller](#)



[dried flower candle holder](#) by [queenginseng](#)



[Windproof Candle Holder](#) by [jalinx](#)



[Coconut candle holder](#) by [Modeo](#)



[Candy Cane Candle holder](#) by [BobbySaka](#)



[Mini "Prayer Candle" Holders](#) by [TheManicCrafter](#)



[Making garden lights easily](#) by [demikian](#)



5-minute Chocolate Cake

Published by [scoochmaroo](#) on October 19, 2008



Author Bio: [scoochmaroo](#) ([author's website](#))

Editor of the Food and Living channels. If you like what you see, subscribe to me!

Intro: 5-minute Chocolate Cake

There are a lot of cake-in-a-mug recipes out there, but I've taken the time to experiment with eight variations on a a recipe to come up with the best, tastiest, and most reliable 5-minute chocolate cake on the web. Give it a try - you won't be disappointed!



CLICK TO PLAY VIDEO 



Step 1: Supplies

microwave!

- coffee mug
- 4 tablespoons flour - [make sure you measure it right - or the cake is a lie!](#)
- 4 tablespoons sugar
- 2 tablespoons unsweetened cocoa
- 2 tablespoons whisked egg - 1 egg is too much, 1 egg white is too eggy, 1 yolk is too dense, but 2 tblsp is just right!
- 3 tablespoons milk
- 3 tablespoons oil
- 3 tablespoons chocolate chips
- splash vanilla or other flavoring - try peppermint or cinnamon

For a fudgier version, omit egg!



Step 2: Mix your ingredients

- Add all of the dry ingredients to the mug and mix.
- Add the egg and combine well. It gets pretty pasty at the point.
- Stir in milk and oil.
- Add chocolate chips* and splash of vanilla. Stir well.

*if you don't have chocolate chips, try a broken up candy bar - I can't stress how much this amps the awesomeness of your cake



Step 3: Nuke It!

- Microwave for 3 minutes in a 1000w oven, or 4 minutes in a 700w oven.

It will start to crown over the top of the mug. Don't panic! It will collapse once the heat stops.



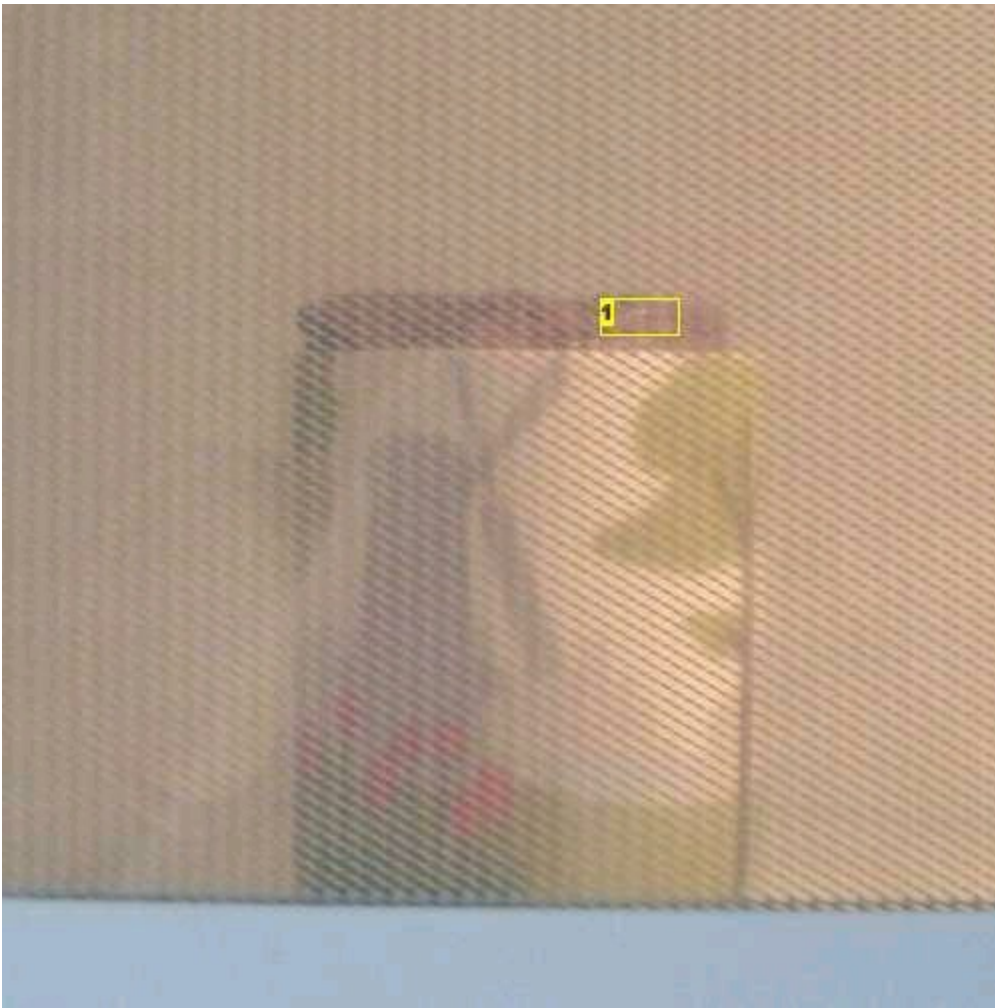


Image Notes

1. it's crowning!

Step 4: Eat it!

Cuidado! Muy caliente!

This cake is still good half an hour out of the oven. In fact, I think it gets better the longer it sits, but I can't speak to how it does after that, since there's never any left!

Enjoy!



Image Notes

1. Fance it up with powdered sugar and it's own bowl! Ooo la la!

Related Instructables



[5 Minute Chocolate Mug Cake](#) by [Will_Tingle](#)



[Mug Brownie](#) by [Spastic](#)



[Single serve instant chocolate pudding](#) by [kinawera](#)



[Quick and Easy Fruity Dessert!](#) by [mossimo3](#)



[Hostess Cupcake cake](#) by [shangrilarcadia](#)



[Quick and Chewy Cuppa Cakes](#) by [DebH57](#)



[Devilish pumpkin devil's food muffins](#) by [trsinger](#)



[NEW AND IMPROVED CHOCOLATE CAKE!!!](#) by [heyzuphowsitgoin](#)



The Microwave Bday Cake

Published by [italiancooking](#) on June 1, 2010

Author Bio: [italiancooking](#) ([author's website](#))



An Italian living in China with a passion for cooking. I grew up in a picturesque town called Lecce nestled on the “heel of the boot”, Italy’s southern tip, between the Adriatic and Ionian seas. Like many traditional families in this sun soaked Mediterranean region, I spent much of my youth under the love and care of my grandmother. Throughout my formative years my grandmother taught me many things but most of all she gave me a passion for cooking. She shared traditional recipes and family culinary secrets passed down through the generations. It is the greatest gift anyone could have bestowed upon me and now I want to share that gift with you!

Intro: The Microwave Bday Cake

I live in China (even though I'm Italian) and here most apartments don't have an oven but just a microwave, which reduces a lot the selection of food I can cook. Anyways, it was my bf's bday and I decided to make him a cake just using our microwave.

Ingredients:

- 125 g sugar (2/3 cup)
- 125 g flour (1 cup)
- 2 eggs
- 100 g butter (2/4 cup)
- 1 tsp baking powder
- 4 tbsp milk (1/4 cup)
- 30 g cocoa powder (1/4 cup)
- 120 ml milk, 2 tbsp cocoa powder
- 200 g whipping cream
- Chocolate Cream Pastry
- MMF (to decorate)



Step 1: Step 1: mix ingredients together

Melt the butter in your microwave at max heat for 1/2 min. Mix it with the sugar.

Add the eggs and beat together

Slowly add the flour and baking powder and then the cocoa powder

Pour in some milk.





Step 2: Step 2: Microwave it!

Drop the mixture in a glass bowl covered with baking paper.

Cook at max heat for 6 min. When it done, slightly open the oven and let it cook down (dont take the cake out until it is cold).



Step 3: Step 3: Let's stuff it up!

In the meantime whip the whipping cream, prepare the chocolate cream pastry and heat some milk and cocoa powder

With a wet knife cut the cake into 3 slices (even 4 if it is high enough) and water each slice with the chocolate milk you have just made.

Place one slide on a plate and spread it with chocolate cream pastry, cover with the second slide and spread more pastry and cover with the last slide.





Step 4: Step 4: Decorate it!

Spread whipping cream all over the cake, so that it is all covered.

Decorate it with the MMF roses and tufts of whipping cream. Refrigerate for a couple of hour before serving

For more recipes you can check my cooking blog: www.expatscucina.com





Related Instructables



[Quick and Chewy Cuppa Cakes](#) by [DebH57](#)



[Chocolate Raspberry Cake](#) by [Gardening Jones](#)



[5 Minute Cake . . . In 30 Seconds!](#) by [saxmaster765](#)



[Kat Litter Cake -- Gifts Impossible to Re-Gift](#) by [trebuchet03](#)



Upside-down Pineapple RoboCake by [caitlinsdad](#)



Fondant! by [cheap champagne](#)



Petit Fours by [wizgirl](#)



Banana Cake by [jc110](#)



Easy Koolaid Microwave Wool Dye Technique

Published by [myrrhmaid](#) on April 16, 2008



Author Bio: [myrrhmaid](#) ([author's website](#))

Fiber mad woman living in the mountains..

Intro: Easy Koolaid Microwave Wool Dye Technique

Easy dye project to use on protein fiber including wool and silk. Use your microwave and in a matter of minutes have art ready fiber for felting, weaving, spinning-project ready!

This is so easy! It just couldn't be any easier! If you have some wool or silk fiber you want to color-this is the way to go! All you need is simple equipment you probably already have in your kitchen and some protein fiber. I like using the powdered drink mix as dyes. They work well, have strong, vibrant colors. Inexpensive to use and are readily available. Safe to use in your own kitchen cookware. Requires no special additions or equipment. Easter egg dyes can also be used.



Step 1: Easier than pie!

Supplies you need-Microwave safe bowl(s), Colander, strainer or salad spinner, Wooden skewer, Rubber gloves (optional), Mesh laundry bag, Unsweetened powdered drink mix in desired color(s), or Easter egg dye, Microwave, Drying rack, Protein fiber- wool or silk fiber

Gather your supplies. Add powdered drink mix to hot water in microwave safe bowl I use Pyrex. Stir to dissolve with skewer. Use 1-2 packets of powered drink mix in desired color, depending on amount of wool used and desired color saturation. Moisten wool with hot water under faucet before adding to dye bath. Squeeze out excess water and push down into dye bath with skewer or hand protected with rubber glove. Or dye your fingertips like I have done!



Step 2: Zap On High!

Microwave on high. Cook at 2 minute intervals for 6-8 minutes for 2 quart bowl or until all the color is absorbed into the fiber. Here I've moved the wool aside in the bowl so you can see that the water is clear as the wool has taken up all the color. This is exactly what I want to happen! The heat of the water bonds the color to the fiber making it colorfast. It won't fade with washings. This is a permanent dye. Use hot pads to remove from microwave. Be careful! It gets really hot! Use the skewer to push the wool back into the water as it cooks, if needed, stirring minimally. Agitation of the fiber will cause felting at this stage. You can also place a microwave safe saucer on top of the fiber to submerge it, if needed.



Step 3: Cool, rinse, spin dry

Let cool to room temperature or strain immediately in a colander over the sink. I have done it both ways, each work. Rinse with warm water.

Put the strained, wet wool in a mesh drawstring laundry sack or pillow case securely closed and spin dry further in the washing machine before laying out to dry completely on a rack. I use an old baby gate for a rack over the bathtub. It works like a charm! The wool dries a lot faster if you spin out the excess water in the washing machine before laying out to dry. Remember to use the end spin cycle only. If you are dyeing small batches, you can use a salad spinner to get more moisture out too.



Step 4: Don't Blink, you'll miss it!

Now see? I was right! That couldn't be any easier! You will be so pleased with the results. I use small batches to dye individual pieces I have cut out of felted sweaters with great results. You can use this method to dye silk, skein wool, socks, sweaters or any protein fiber that can fit in the microwave. When I cut out pieces to dye in the microwave from recycled wool felted sweaters, the process gives the wool a more compact & fuzzy texture. It's very lovely. The idea is to experiment and have fun!



Step 5: Project complete

Great for wet or dry felting, spinning, weaving making stuff for babies, kids, moms, dads, dogs, cats-anyone that likes this kind of thing! They juggle great & are easy enough on lamps & furniture to play with indoors. Wool's wonderful properties make it a very safe material especially for asthmatic or allergic children. Wool doesn't harbor mites like other stuffed toys/animals can. Also wool absorbs heat as it is held, which is a comfort & welcoming-especially in a treasured doll or stuffed animal. Shown here are needle felted wool beads. Delicious! (Not for human consumption).



Related Instructables



[Stovetop Kool-aid Dying using Alum as an modant](#) by [Winged Phantom](#)



[Dyeing wool for projects](#) by [SallyOH](#)



[Felted Pet Hair Beads](#) by [ChrysN](#)



[Dyeing Wool Yarn with Madder Root](#) by [lescarroll](#)



[Killer tie-die](#) by [prank](#)



[How to Dye Yarn: Handpainting](#) by [kewpiedoll99](#)



[Mystic Lord costume: horns, armor, silk painting + more \(oh my\)](#) by [houseofdarkly](#)



[Tea-dying](#) by [PearlZenith](#)



How To Take Apart A Microwave

Published by [Plasmana](#) on October 27, 2008

Author Bio: [Plasmana](#)

_____ My motto: "Energy cannot be created nor destroyed!" _____ I have a brain condition called Asperger syndrome, so I may be a bit strange to you... And I tend to take things a bit too literally.

_____ I love anything that can light up the skies and ending with an loud band, lighting, fireworks, and EXPLOSIVES! As long as no harm has been done, therefore I absolutely hate wars, what is the point? I was born and raised in New Orleans, USA, then my family finally decided to move to England after Hurricane Katrina gave us a push to do so. After we moved, I developed great interest in electronics, then igh voltage electronics. I have archived many projects I wanted to do, but never succeeded at constructing the ultimate project, the Tesla Coil... But I am not that easily discouraged, I will continue working on until I succeed. There is a saying that my Gran always say, "The first you failed, try and try again until you succeed!" Now I go to College and study Electrics (not surprising!) to get my qualification, because all of this dang ultra strict Health and Safety laws!



Intro: How To Take Apart A Microwave

Taking apart microwaves can be dangerous, on this instructable I will show you how to take apart a microwave safely and explain the parts and what you can do with them..

I found this microwave (pictured) lying around in the streets, I took it home with me and took it apart, meanwhile, I decided to make an instructable so you can get an idea of how to take apart a microwave and what its parts can be used for.



Step 1: What equipment you will need...

You will need tools to take apart a microwave, your bare hands won't work. :-)

- A set of screw drivers with different shapes and sizes.
- Wire cutters
- Pliers
- Alligator clip
- Hammer (you don't need this unless something needs to be banged apart)

You might need other types of tools depending on the type of microwave you are going to take apart.

Step 2: Warning!

Yeah, thats right, taking apart microwave can be very dangerous if you do it improperly...

There is an high voltage capacitor in there that can be still charge and can give out an lethal shock.



Image Notes

1. Obey this!
2. Or you might get killed if you don't...
3. Forget that... It is just trying to ruin your fun.

Step 3: Begin taking off the cover

Start taking the top cover off carefully and try avoid touching the wiring!



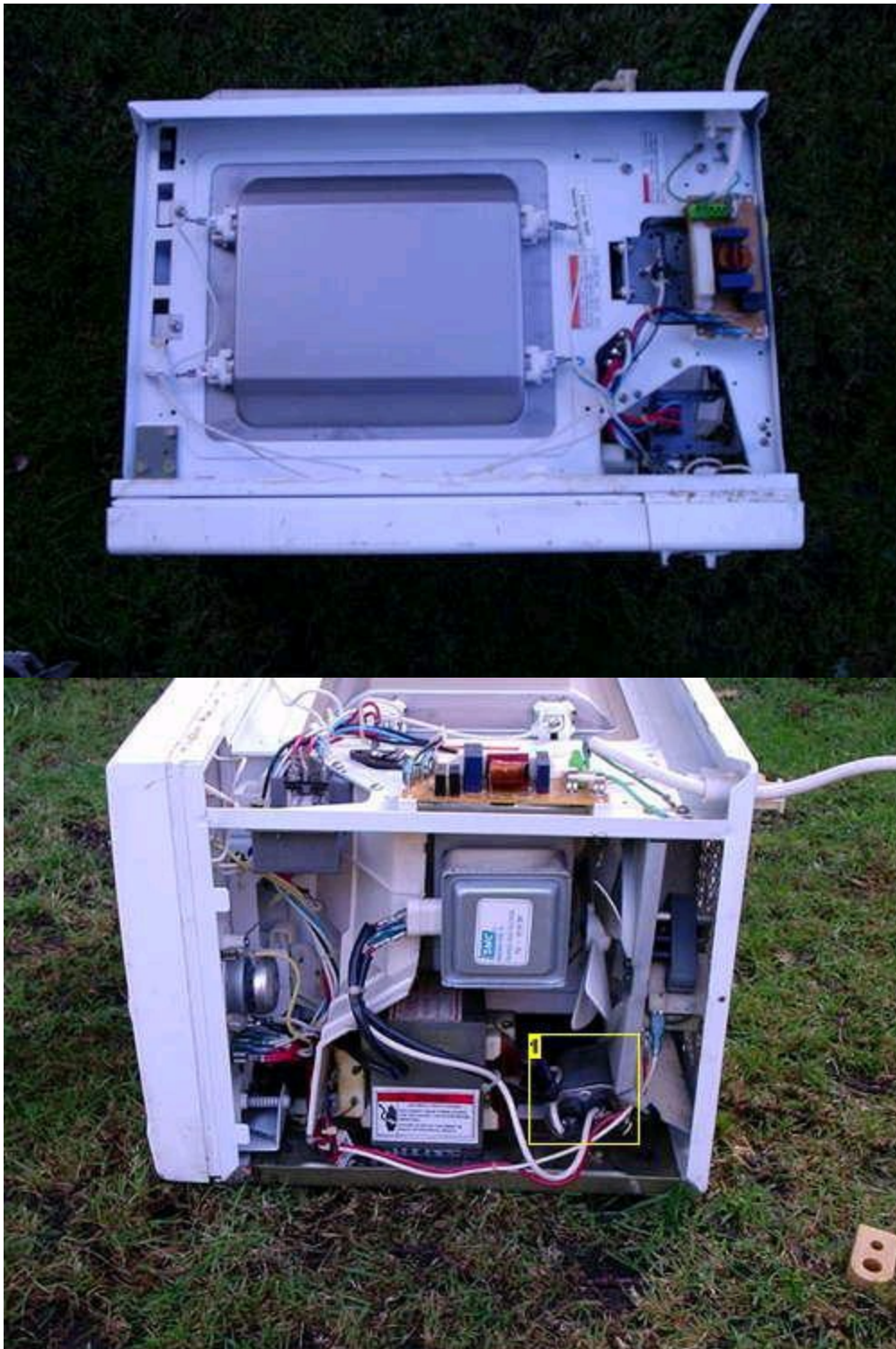


Image Notes

1. The high voltage capacitor...

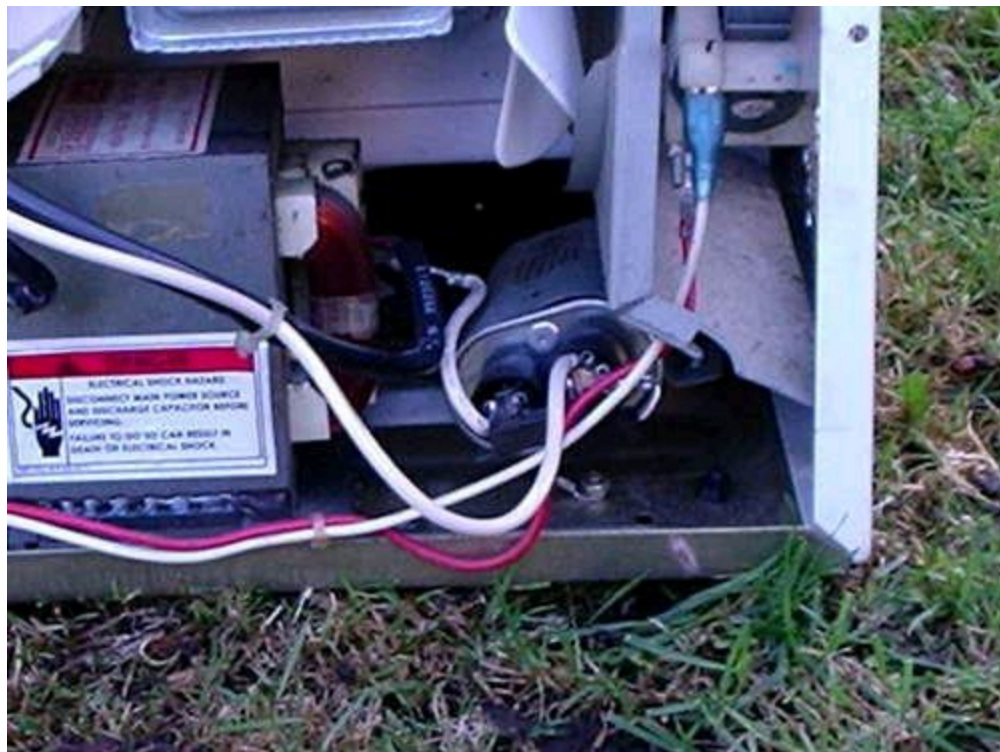
Step 4: Discharge the capacitor

Locate the capacitor, it should be near the big fat chunk of metal, the high voltage transformer. Then get your alligator clips and very carefully touch both terminals of the capacitor...

You may get an loud "SNAP" (which is unlikely) and that indicate the capacitor is discharged, do this a few more time to really make sure the capacitor is discharged..

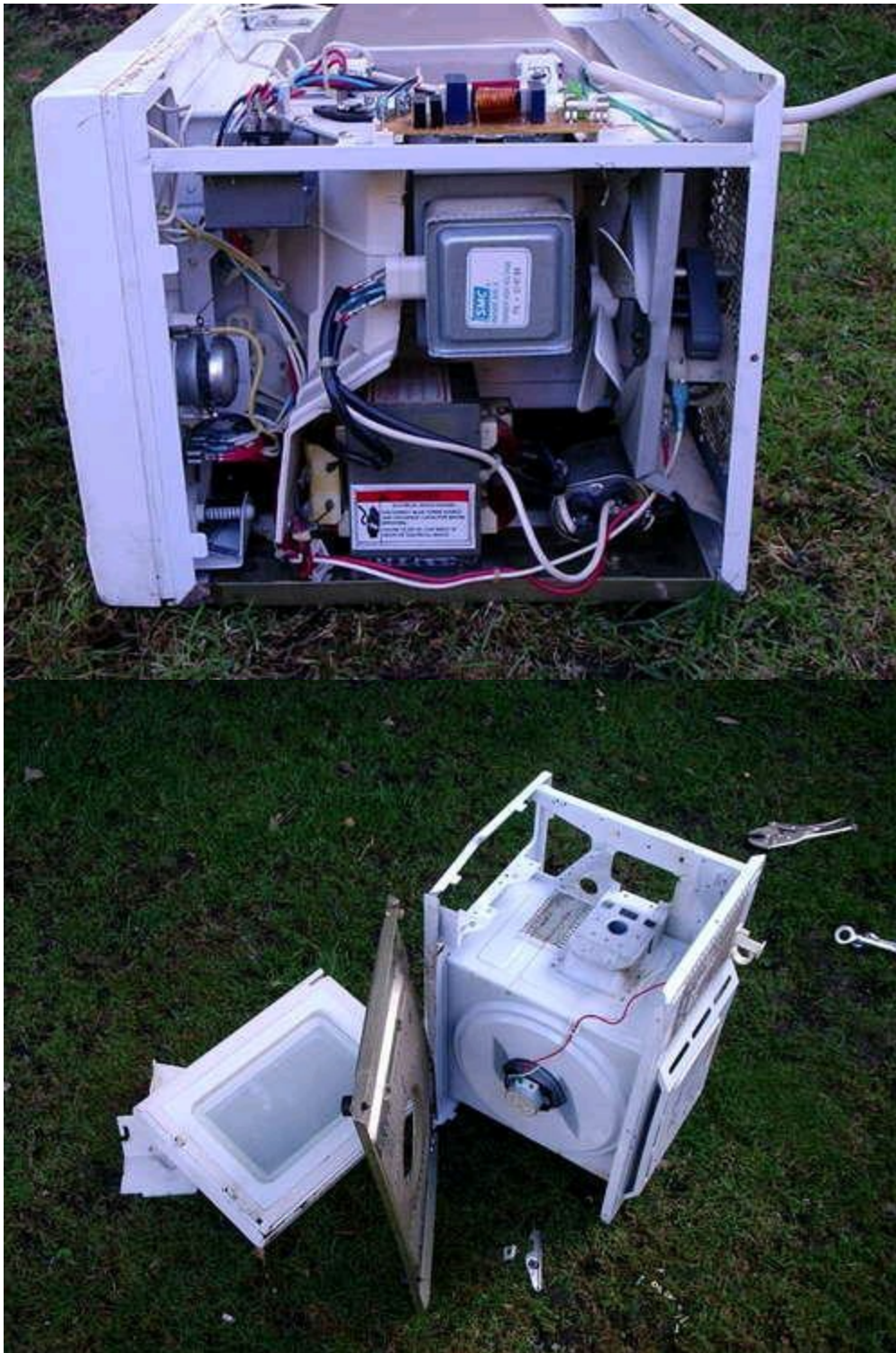
And you're done! The microwave is safe to gut out!

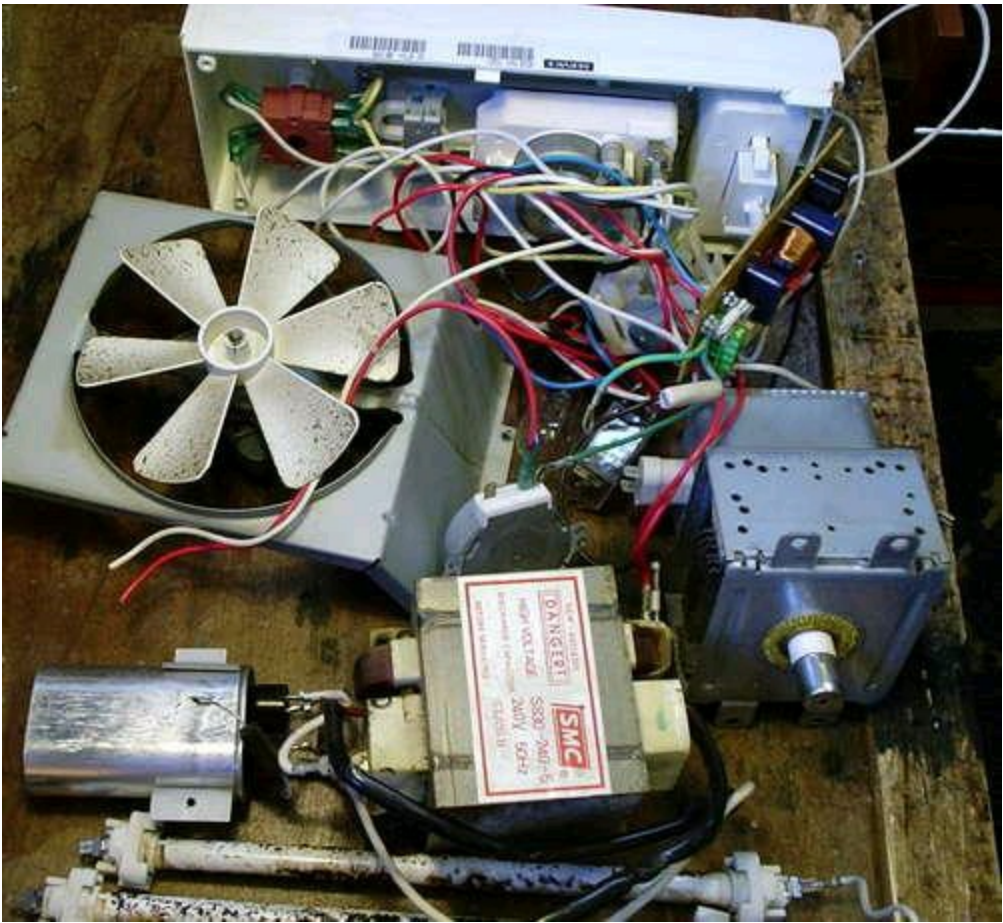




Step 5: Gut out the microwave

Well, what are you waiting for? Gut the microwave part you want!





Step 6: What to do with all of this stuff?

After you had gutted the microwave, you can find a lot of pretty good stuff, read on through the instructable to fine out what they are and what you could do with them!



Step 7: The magnetron

This device, the magnetron, is what heats up our foods...

There is hardly any use for this device, but the magnetron have two very large and powerful ceramic magnets! You can hack the magnetron open and extract the magnets and use them for your other projects.





Image Notes

1. Neodymium magnet
2. Another neodymium magnet

Step 8: The high voltage transformer

Now this one, is the most dangerous microwave component of all... The high voltage transformer...

The transformer give out 2Kv (2000) AC with outputs of 500mA to 2 amps, far more than enough to instantly kill a person...

The transformer can be put to good use for many high power projects, but most often, people would mod them, and use them to draw arcs for fun... But that is going to be another instructable...

Here is an video of me drawing arcs and lighting sparklers with the microwave transformers.



For some very odd reason, after the sparkler is burnt out, the arcs are much longer, I don't know why it is doing it... Can any body give me an explanation?



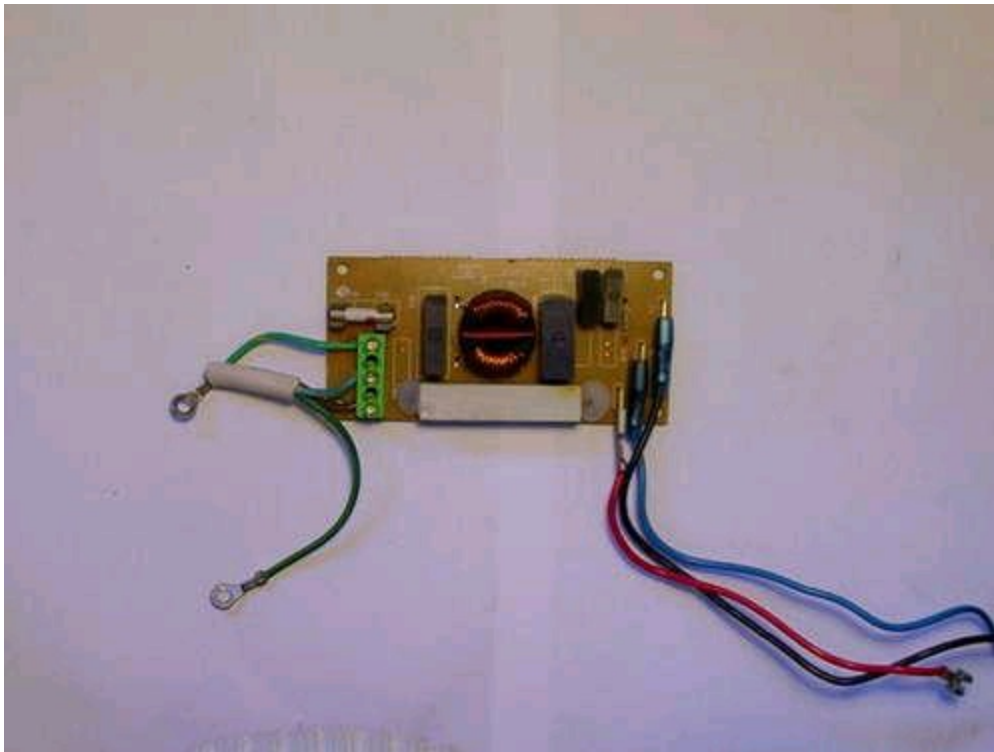
Step 9: Capacitor and diode

You can use those for some of your high power projects like tesla coils, can crusher, ect.



Step 10: Line filter

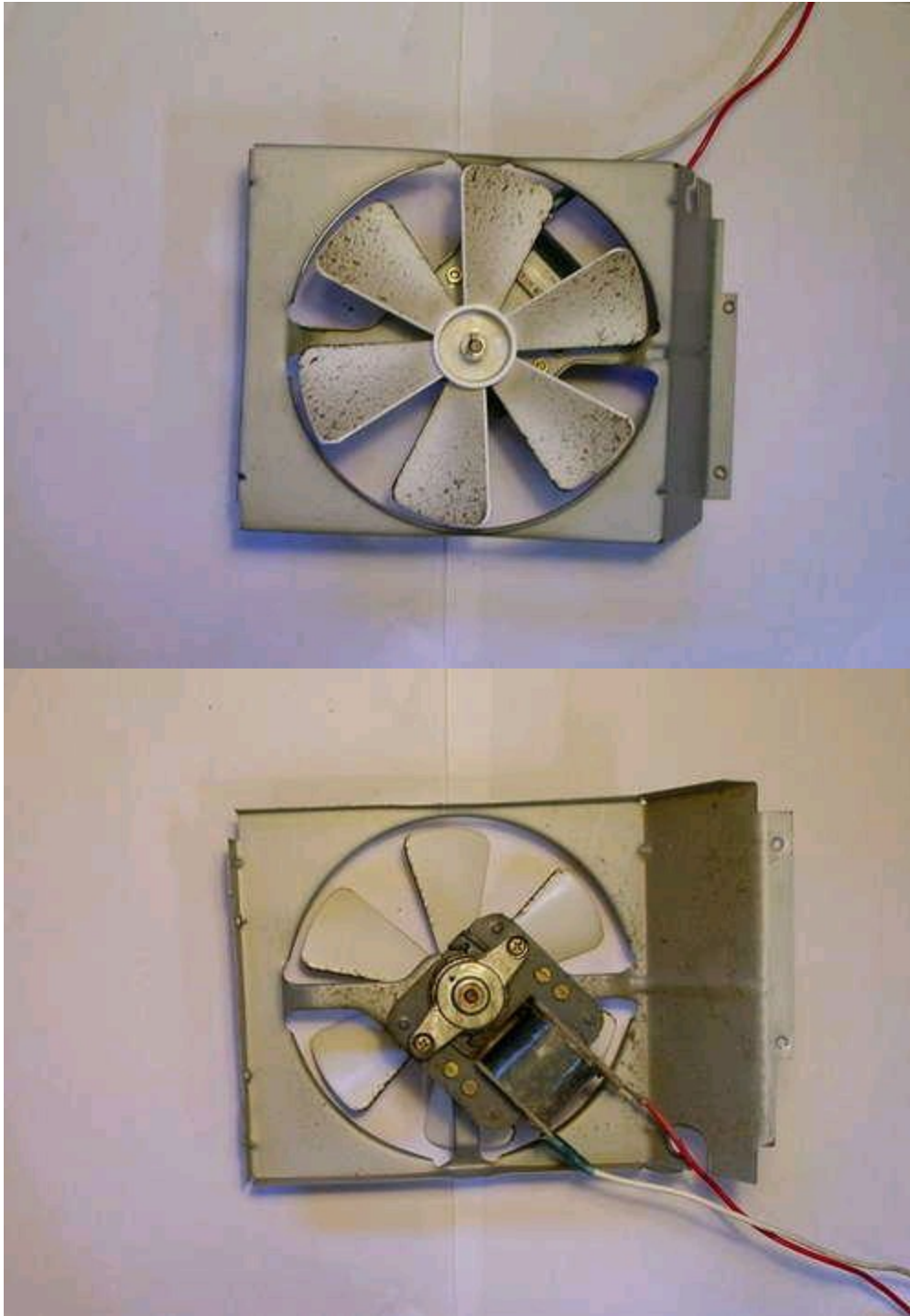
Those things can be useful if you know what you are doing with them...



Step 11: Cooling fan

You can use the fan to cool your self down on a hot day...

I used it as a ventilation fan for my workshop to get rid of all or the solder fumes and other smokes...



Step 12: Turntable motor

Those motors spin very slowly, you can add an plate on it rotors and display your things on the table.



Step 13: Power relay and light bulb

You can use the relay for heavy load switching and if the light bulb still works, you can save it as a replacement bulb for other microwaves.



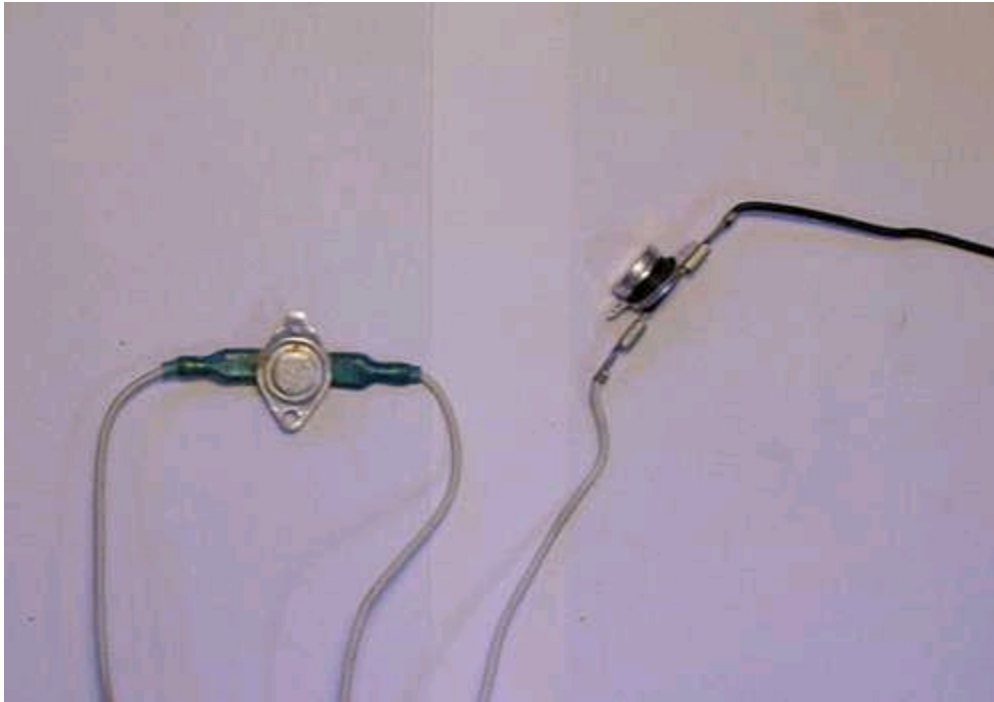
Step 14: Bell and timers

You could use them as a timer for something?



Step 15: Thermal fuses

Sometimes, you can find an thermal fuse(s) in a microwave - often found near the magnetron. They are used to break the circuit from the mains if the magnetron overheats...



Step 16: Safety switches

The safety switches can be found near the door. You can use it for safety on your other projects or possibly build a beam robot with it...



Step 17: Heating tubes

Very strangely, my microwave has two quartz halogen heater tubes.

If you have those tubes, you could use it to make your own heater, or you can salvage the tubes for the nichrome wire (heating element) and use it for some of your other experiments...



Step 18: The end

Well, I hope you find this instructable helpful!

If you have any questions, or need help, or found an error, or anything, make a comment!

I like comments! :-)

Related Instructables



[How To Take Things Apart Without Killing Yourself](#) by [mad magoo](#)



[How to: Resonant Microwave Oven Transformer High Voltage Supply.](#)
by [HazzWold1993](#)



[Very Low Cost Sheet Metal Spot Welder \(Portable & Convenient\)](#) by [mrjohngoh](#)



[How to: High current Microwave oven Transformer](#) by [HazzWold1993](#)



[Work safely with high voltage](#) by [kovo](#)



[Microwave Oven Transformer High Voltage Rig](#) by [DevCoder](#)



[How To Build A Vacuum Tube Tesla Coil \(VTTC\)](#) by [Xellers](#)



[Step By Step Plans To Building A 250,000 Volt Tesla Coil](#) by [Tesla Coiler](#)

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